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THE GAS JOURNAL

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A Glance at the Contents—

Removal of the Organic Sulphur of Gas.

The researches undertaken in connection with the production of sulphur-free gas for use in the synthetic manufacture of liquid fuels by the Fischer process are referred to in our " Continental Notes " this week. [p. 531.]

Uniformity of Electricity Tariffs.

Concluded this week is the article by " Engineer " on the effect on the Gas Industry of the Report on Uniformity of Electricity Charges and Tariffs by a Committee appointed by the Electricity Commissioners. [p. 531.]

Floodlighting of Gas Showrooms.

An illustration on a later page shows the very striking results obtained by the Croydon Gas Company in the floodlighting by gas of their recently opened Wallington Showrooms. The building is of a Spanish design and lends itself well to effective floodlighting. A photograph also shows the type of lamp used. [p. 529.]

Effect of Dehydration and Oil Fogging on Meters.

In a paper before the American Gas Association Distribution Conference, Mr. J. E. Spindle, of the Grand Rapids Gas Light Company, Michigan, discussed this subject, and gave results of tests carried out with a view to comparing the condition of meters before and after the introduction of oil fogging. [p. 542.]

British Association for the Advancement of Science.

The Centenary Meeting of this Association will be held in London from Sept. 23 to 30, and from the point of view of the Chemistry Section the importance of the meeting will be greatly enhanced by the arrangements which are being made by the Royal Institution to celebrate at the same time the Centenary of Faraday's discovery of benzene. [p. 528.]

Bunker Oils for Carburetting.

As a contribution to the A.G.A. Joint Production and Chemical Conference in May this year at Philadelphia, Mr. R. F. Davis, of the Indiana Electric Corporation, gave the results of tests carried out at the Fort Wayne Plant. From the results obtained, Mr. Davis is of opinion that checker bricks can be kept clean and that an appreciable saving in generator fuel can be effected when using heavy fuel oils. [p. 534.]

Davidson Rotary Carbonizing System.

This retort, described in this issue, was invented by Mr. T. M. Davidson, of Patent Retorts, Ltd., 5, Victoria Street, S.W., and is being operated by the New Consolidated Gold Fields, Ltd., 49, Moorgate, E.C. 2. The retorting of coal has been carried out under the direction of Mr. John Roberts, D.I.C., Fuel Consultant to the latter Company, who supplied us with the photographs and much of the information. [p. 536.]

Glover-West Verticals in Canada.

We give to-day, by the courtesy of " West's Gas," a brief description of a carbonizing and bye-product plant contract secured by West's Gas Improvement Company in Belleville, Ontario. The carbonizing plant consists of four 33-in. ovens in single units. [p. 535.]

View of Gas-Works from Southall Gasholder.

We reproduce to-day a photograph of the Southall Gas-Works taken from the top of the new 8-million c.ft. waterless holder, with the chief points of the works noted. The photograph we published last week, which we stated to be of the gas-works, was, in reality, the chemical works only. Members of the general public are taken to the top of the holder by lift at certain hours of the day, upon payment of a small fee, and the proceeds are handed over to the Southall Hospital. [p. 539.]

The Hydrogenation Process.

A correspondent in to-day's issue, dealing with the hydrogenation process, points out that if coal can be increasingly used directly or indirectly through utilization of its products for any need of British industry, it is to the national interest in the present conditions of international stress, providing it can be done economically. Hydrogenation, of all possibilities, he states, appears to have the biggest lure from the aspect of not merely promoting the use of coal, but of greatly increasing the quantity mined. [p. 526.]

Progress of Pipe Joint Research by the A.G.A.

During the past year three subjects have received the greater part of the attention of the American Gas Association Testing Laboratory at Cleveland, Ohio. These are the repairing of old bell and spigot joints in service, the testing of new joint combinations in large size, and a study of vibration of mains due to traffic. These points are discussed in order in a contribution by Mr. K. R. Knapp, Chief Engineer to the A.G.A. Laboratory, to the Distribution Conference of the Association in April last, published on a later page of this issue. [p. 543.]

Modern Trends in Gas Engineering Practice.

" Some of us have considered that we have been, and are, gas engineers, but engineering in the Gas Industry is changing so rapidly that it is just about possible for most of us to keep up with the rapidly changing times in addition to our regular duties. To succeed, however, we must be alert and ready to adopt new practices which have been tried out by others. Sometimes it is necessary for some of us to pioneer and to attempt new practices entirely on our own responsibility, and quite often we are rewarded by greatly improved efficiencies in our plant operation."—Mr. E. A. Munyan, Gas Manager to the Union Gas and Electric Company, Cincinnati, Ohio, in a paper before the Annual Conventon of the Canadian Gas Association. [p. 540.]

EDITORIAL NOTES

Gas and the Illumination Congress

IT is gratifying to note, from the full details which we were able to publish in last week's "JOURNAL"—pp. 473-475—that the Gas Industry is taking its part in the International Illumination Congress that opened in London yesterday with an official luncheon given by the Gas Light and Coke Company and the London Electric Supply Undertakings at the Savoy Hotel, and a subsequent round of visits. At the time when the details appearing a week ago were prepared, a goodly number of members of the Gas Industry had notified their intention to be present during the meetings, and doubtless the list has since then been considerably increased. The sessions are being held in different places, which should make it possible for a larger aggregate number to attend the proceedings, wholly or in part, than otherwise would have been the case.

It is to be hoped that during the Congress, and the gatherings of the International Illumination Commission, there will be no occasion on which gas is not fairly represented. The list of papers to be submitted covers a wide field, and there are subjects to be dealt with upon which our Industry can speak with the highest authority. In all, the papers number about 150. Besides those which have been submitted by the Institution of Gas Engineers, on behalf of itself, the British Commercial Gas Association, and the Society of British Gas Industries—three of which will be presented in Edinburgh, on Sept. 7, in conjunction with the annual meeting of the Association of Public Lighting Engineers, and the fourth in Buxton, on Sept. 10—there are a number of communications that will prove of general interest to the Gas Industry.

Apart from the business sessions, extensive London and Provincial social programmes have been arranged, while the flood lighting to which reference has already been made in our pages, and modern indoor lighting installations of all kinds, will be an important feature of the Congress. It is interesting to learn that the success of the "London by Night" tour arranged by the Institution of Gas Engineers last June has encouraged the organizers of the International Illumination Congress to arrange a similar trip.

Private Acts of Last Session

THERE emerge from the last Session of Parliament (in addition to a number of general measures containing clauses relating to gas) just half-a-dozen Private Gas Acts—this being one less than the number of Bills promoted, consequent upon the withdrawal of the Bill of the South Yorkshire Gas Network Company. Though few in number, however, these Acts present various features of interest.

In the first place, there is the Bill promoted by the Aldershot Gas, Water, and District Lighting Company. This is now entitled the Mid Southern District Utility Act, in accordance with the new name which the Company have been empowered to adopt, and the alteration is a sign of the times. The present-day policy of amalgamation and of large-scale working generally, will result in many concerns becoming "district" undertakings, and, as a matter of fact, the Mid Southern Act still further extends the already extensive area which relies upon the Company for its supply of one or more of the public services—gas, water, and electricity. This time it is the gas area which is extended to include certain parts of the parishes of Compton and Godalming Rural.

Further progress in the direction of amalgamation is to be found in the Act of the Gas Light and Coke Company, which provides for the transfer to the Company, on terms arranged, of the undertakings of the Southend-on-Sea and District Gas Company and the Brentwood Gas Company. The transfers are to take place as from Jan. 1, 1932. A clause for the protection of the Southend-on-Sea Corporation provides for payment by the Gas Light and Coke Company of sums due to the Corporation in connection with the gas undertaking of the Corporation which was transferred to the Southend Company by the Southend-on-Sea and District Gas Order, 1923. The compensation for loss of office to the Directors of the Southend and Brentwood Companies is to be seven years' purchase of the annual amount of remuneration; and to the Auditors, three years' remuneration. As to the employees, the scheme relating to the compensation to be paid to employees of authorities, companies, or bodies carrying on gas undertakings for loss of employment consequent upon the amalgamation of such undertakings which was adopted by the National Joint Industrial Council for the Gas Industry on May 1, 1930, shall apply to others than staff officers of the companies. Subject to the provisions of the Act, the basic price of gas supplied by the Gas Light and Coke Company shall be 11d. per therm, and the basic rate of dividend 5 p.ct. There are clauses enabling differential prices to be charged in the Southend and Brentwood districts.

An amalgamation measure somewhat different in character, in that electricity is included, is the Guildford Gas and Cranleigh Electricity Act, which provides for the transfer to the Guildford Gas Light and Coke Company of the undertaking of the Cranleigh Gas and Electricity Company, Ltd. Electricity is, however, evidently not the prime object of the scheme, judging from the preamble, which sets out that the limits of the Guildford Company adjoin those of the Cranleigh Company, and it would be to the advantage of consumers of gas within the limits now supplied by the Cranleigh Company that the undertaking of that Company should be amalgamated with that of the Guildford Company. The Cranleigh Company have agreed to sell their undertaking, and as they do not wish to retain their electricity undertaking the Guildford Company have also agreed to purchase that. The Act was Royal Assented on June 11, and as the date of transfer is to be July. 1 or Jan. 1, whichever shall first occur next after a period of one month after the date of the passing of the Act, the Guildford Company will take over the Cranleigh undertaking as from Jan. 1, 1932. The differential is fixed at not more than 4d. per therm, and the terms of purchase appear in the Act. With regard to compensation, in the cases of Directors and Auditors the amount is upon the same basis as in the Gas Light and Coke Company's Act; while provision is also made for compensation to the Secretary to the extent of seven times the amount of the salary, fees, and emoluments received by him in respect of 1929.

Extended Activities

One of the reasons for the Lowestoft Water and Gas Company going to Parliament was that they desired an extension of the limits within which they are authorized to supply gas. In the Bill as drafted the parishes to be added in this way were stated as Hopton, Corton, Flixton, and Blundeston; but in the Act the additions made are given as the parishes of Corton (except so much thereof as lies to the north of Beach Road), Flixton, and Blundeston. Within these added limits the Company may charge for gas a price exceeding by not more than 2·4d. per therm the price charged within the existing area. Further lands may be acquired by the Company for the purposes of their undertakings, up to 20 acres, of which not more than 5 acres shall be for the gas undertaking. All this is an indication of the progressive policy of the concern, which, it is interesting to note, was, until its Act of 1897, named the Lowestoft Water, Gas, and Market Company.

Yet one more instance of amalgamation is to be found in the Royston and Brodsworth Gas Act, which provides for the merging into one of the undertakings of the Brodsworth and District Gas Company, the South Elmsall and District Gas Company, and the Royston (Yorks) and District Gas Company, Ltd. The areas within which the Brodsworth Company and the South Elmsall Company are supplying gas are contiguous, while that of the Royston Company is not far distant, and is separated therefrom by areas not within the limits of supply of any authorized gas undertaking. The three Companies will be dissolved, and incorporated in a new company under the title of the Royston and Brodsworth Gas Company. Under an Act of 1867, the Barnsley Gas Company were authorized to supply gas in Barugh Darton, Royston Carlton, and Notton, but these powers were never exercised, and are now repealed. As a matter of fact, gas has for some years been supplied by the Royston Company to these areas. There are clauses enabling the purchase by agreement of the undertaking of the Hemsworth, Grimethorpe, and District Gas Company, Ltd., while others provide for the possible purchase, after stated periods, of portions of the Royston undertaking by the Royston Urban District Council and the Cudworth Urban District Council.

Taking them in alphabetical order, the last of the Acts is the valuable one which enlarges and alters the powers and obligations of the Sheffield Gas Company with respect to the purchase and supply of coke oven gas, and extends the Company's limits of supply. The full report which appeared in the "Journal" of the lengthy proceedings when the Bill was before the Committee of the House of Commons will have made readers thoroughly familiar with the position reached and the various matters leading up to it. When referring to the parliamentary inquiry in our editorial columns on June 24 last (p. 927), we remarked that, with the passing of the first Bill presented to Parliament to enable a gas undertaking to construct a coke oven gas network or grid, "the Industry is on the threshold of what will doubtless prove to be a development of far-reaching importance. The responsibilities which the Sheffield Gas Company are undertaking will, we hope, prove of advantage to them and to the Gas Industry at large." There were, of course, originally two measures promoted, having for their object the supply of coke oven gas on a grid scheme; but the Bill of the South Yorkshire Gas Network Company was subsequently withdrawn, as the result of agreement between the parties.

Superannuation Funds and Income Tax

It will be recollected that Section 32 of the Finance Act, 1921, contains an important provision whereby exemption from income tax is granted in respect of income derived from investments or deposits of a superannuation fund approved by the Commissioners of Inland Revenue in the terms of Regulations made by the Commissioners thereunder (Statutory Rules and Orders No. 1699 of 1921). Similarly, any sum paid by an employer or employed person by way of annual contribution is declared to be an allowable expense to be deducted from profits assessed under Schedule D or remuneration assessed under Schedule E. The exemption previously applied only to funds having as their sole purpose "the provision of annuities for persons employed in the trade or undertaking either on retirement at a specified age or on becoming incapacitated at some earlier age," but the Finance Act, 1930, extended this relief to funds, approved by the Commissioners, established for the provision of annuities for the widows and orphans of persons so employed.

In view of the relief afforded by this exemption, and to prevent any scheme for the avoidance of income tax, the Regulations referred to contain provisions governing the return of contributions (together with interest thereon, if any) to employers and employed persons. In the former event, income tax at the rate in force for the year of repayment is to be deducted; while in the case of an employed contributor who during his lifetime receives a refund of contributions or a lump sum in lieu of an annuity, income tax at one-third the standard rate in force for the year of repayment, is to be paid by the trustees of the fund. The Inland Revenue Authorities have recently announced that, following representations to Somerset House to have this payment discontinued in the case of the withdrawal of contributions by a member of an approved fund, arrangements have been made—as from April last—to charge only one-fourth, instead of one-third, the standard rate of income tax upon such repayments.

This concession is of practical value, and should form a still further inducement for the setting up of superannuation funds. A perusal of the Special Orders applied for by gas undertakings indicates that the Industry is not lacking in appreciation of their value to both employed persons and employers in creating good will.

Rating and Valuation (Apportionment) Act, 1928

We note that a large municipality in the North of England has been successful in substantiating a claim for relief, in respect of the gas undertaking's chemical works, under the De-Rating Act of 1928; furthermore, the decision of the Assessment Committee has been upheld by Quarter Sessions, and the appeal of the Revenue Officer dismissed.

This case has been described as "the first of its kind;" and it is gratifying to observe that the exclusion of public utility undertakings from the benefits of rating relief may not be so rigid as at first seemed probable. At the same time we can see little possibility of the decision, in its present form, being of assistance to the majority of gas undertakings, as the Recorder's ruling was based on the fact that, while certain chemicals were produced, no gas was actually manufactured at the chemical works, which had always been separately rated. The question, therefore, resolved itself into the meaning of the word "primarily" in section 3 (1) (*e*) of the Act; and it is probably safe to say that the undertaking in question is one of very few which could claim that any part of the property of the gas undertaking was not "primarily carried on for the supply of gas . . . for public purposes, or to members of the public. . . ."

Nevertheless, we shall continue to watch for any extension of this claim, which is the only possibility left to the Industry since Parliament—despite the excellent manner in which Mr. R. G. Clarry and Mr. Will Thorne (see "Journal" for July 25, 1928) put forward the case for equal treatment with the other productive industries of the country, on the debate on the Third Reading of the Rating and Valuation (Apportionment) Bill, 1928—decided that the de-rating of industrial hereditaments must not extend to statutory and non-statutory "public supply undertakings." The grounds of the Industry's claim for participation (or partial participation) in the scheme for rating relief were set out and examined in the "Journal" for April 1, 1931.

PERSONAL

NOTTINGHAM GAS UNDERTAKING.

The Gas Committee of the Nottingham Corporation, with Alderman Sir Albert Ball as its Chairman, has been engaged for several weeks in dealing with applications for the post of Engineer and General Manager of the Gas Undertaking, which has been rendered vacant by the resignation of Mr. John Wilkinson. From among a large number of applicants from various parts of the country the list of candidates to be finally interviewed has now been reduced to four, and a decision in relation to the matter is anticipated in the course of a few days.

Special opportunities for dealing with the points raised in the final report of the Government Committee on Education for Salesmanship, presided over by Sir FRANCIS GOODENOUGH, C.B.E. (a full résumé will be found in the issues of the "JOURNAL" for Aug. 12 and 19), will occur next year when the International Congress on Education for Commerce will be held in London, as a result of the invitation given by the British Delegation to the last Triennial International Congress, held in Amsterdam in 1929. Very widespread and influential patronage is being given to the Congress in London, in July, 1932, which it is believed will be largely attended by delegates from all over the world. The Congress is being organized by the British Association for Commercial Education, which is being formed as the outcome of the Amsterdam Congress, and of which, and also of the British Committee organizing the International Congress, Sir Francis Goodenough has been elected Chairman.

Mr. J. ROBINSHAW, Engineer, Manager, and Secretary of the Westhoughton Consumers' Gas Company, has secured a similar appointment with the Hassocks and District Gas Company, Sussex. He was formerly Assistant Manager to the Milnrow Gas Company, near Rochdale. His successor at Westhoughton is Mr. C. E. SMITH, Assistant Manager of the Retford Corporation Gas Department, Notts.

The resignation of Mr. CHARLES WALMSLEY, Chief Clerk of the Accrington Gas Undertaking, who has been appointed Assistant Accountant to the Preston Gas Company, was accepted on Aug. 26 with much regret. Mr. Walmsley has had considerable service with the Accrington Undertaking.

OBITUARY

The death of Mr. W. WHATMOUGH took place at his residence, 9, Rectory Road, Southport, on Aug. 2, at the age of 71. Mr. Whatmough was an official of the Heywood Town Council and its predecessors for 54 years, commencing work in the Water Department and retiring from the position of Gas Engineer in 1927. He was a member of the Manchester District Institution of Gas Engineers from 1890 and held the office of Secretary from 1908 to 1914, and in 1917 was elected the President. The interment took place on Aug. 5 at Heywood Cemetery and was preceded by a service in St. Luke's Church, Heywood. Among those who attended the service, in addition to the relatives, were the Mayor and members of the Heywood Corporation and Officials, together with Mr. T. Duxbury (Oldham) and Mr. J. Bridge (Elland), representing the Manchester and District Institution of Gas Engineers.

Mr. Whatmough was a prominent Freemason, and at the conclusion of the burial service at the graveside by the Rector of Heywood, a masonic service was conducted. Mr. Whatmough had been twice married and is survived by a widow.

CORRESPONDENCE

The Hydrogenation Process

SIR,—It can hardly be gainsaid that if coal can be increasingly used directly or indirectly through utilization of its products for any need of British industry, it is to the national interest in the present conditions of international stress, providing it can be done economically. Coal lies at the base of British industrial prosperity, finding employment, even in these depressed times, for about 825,000 people, mostly adult males. In twelve months the decline in the numbers employed in mining has been over 76,000, all of whom have swollen the "dole" recipients—surely a potent reason why anything that utilizes coal or its derivatives should not be lightly rejected.

Among the derivatives of coal are coke, gas, tar for British roads, and an ever-increasing list of useful commodities derived from tar. Low-temperature carbonization has held out a vista, up to the present disappointing in attainment, that a satisfactory smokeless fuel would be produced at an economic price, which would render the use of raw coal unnecessary either for industrial or domestic use, and lift from Britain the smoke pall which plays such havoc. Now hydrogenation comes along, and of all possibilities it appears to have the biggest lure from the aspect not merely of promoting the use of coal, but of greatly increasing the quantity mined.

There are competing viewpoints as to the various forms in which heat energy should be provided—the competition, for example, between low temperature and high temperature coke producers, between coke ovens and gas-works, between gas undertakings and the coal merchants, and so on. But there cannot, or should not, be difference of opinion upon the basic fact that, in one way or another—indeed, by all ways that lie open—the prosperity of the British mining industry should be stimulated with as little trespass upon such artificial specifics as subsidies, statutory restriction of output, corners in price fixing, &c., as possible.

Hydrogenation is a long way from being a proved commercial success, but enough is contained in the letters which you rendered a public service by reproducing in the "GAS JOURNAL" of Aug. 19 (p. 424-425) to indicate that the prosecution of its success should be raised to the pinnacle of a front-rank national question. What a tremendous gain it would be to Britain to render herself independent of imported oil for transport, or even make a substantial contribution thereto!

Assuming hydrogenation proved successful, and Sir Harry McGowan raises high hopes that it will be, there are gas engineers who are doubtless wondering what effect that would have upon the Gas Industry, and lest the effect should be adverse, are simply "standing by." In the writer's view that is neither justifiable, patriotic, nor in the interests of the Gas Industry. Something must be done to get the national focus back from electricity to coal. We are dissipating too much energy upon what is a "side-line," when by all canons of reason energy should be directed to the basic industry—coal. We are increasingly becoming pawns to foreign countries for our national needs, and the boost which has been given to electricity has something to answer for in this connection. There never should have been an Electricity Board—at least, not precedent to a National Fuel Board which embraced all national heat and power needs, and *started with the lump of coal instead of the dynamo.* Though we seem to have gone too far to undo the mischief of that "one-eyed" vision, we can at least make an effort to get the nation to stand four-square against further mistakes along its narrow and tortuous path.

There is no section of the community more competent to urge that the claims of home-produced oil should have exhaustive consideration than the Gas Industry, which has already had more than a century's experience in coal treatment, yet stands to-day as having an independent voice on the subject of hydrogenation. It is fairly certain that in the event of its success the Industry would be the gainer, for, once it becomes recognized that the country has the capacity to produce its liquid fuel requirements economically, the market for coal tar derivatives will be assured. Therefore, not merely Britain's need to be more independent of imported supplies, but policy on other grounds, suggests that the Gas Industry should be active supporters of hydrogenation, and not merely "benevolent neutrals."

Last week you published a letter from Commander Colin Buist, who referred to the primary attention now being given at the Fuel Research Station to hydrogenating creosote and other tar oils, the report upon which "is awaited with the greatest interest." The immediate crucial problem, however, is to establish a halt in the mad rush for electrification, created by the Weir Report and by other activities which emerge from sources with an electricity complex. In railway transport the Diesel oil engine as a generator of electricity (see last week's "JOURNAL," p. 476) has strong claims, the strongest of which, in present circumstances, is that it can be adopted gradually as economic circumstances dictate and as transport circum-

stances warrant. It was by such methods that Britain built up her pre-war prosperity, and by which she will emerge from the post-war depression, and not by recklessly spending hundreds of millions on schemes which put shackles upon industry without possibility of release, and to the utter confusion of enterprise devoted to other and cheaper means of achieving the same ends.

The most welcome companion of the Diesel engine would be home-produced oils. The two together are the trump card by which it would appear the "trick" will be taken against the Weir Report and its electrical partisans. The Gas Industry must strive for (following up what it has already done in the same direction) a breathing space in which hydrogenation may have fair chance to justify itself or otherwise. What is really needed is a "Five-Year Moratorium" from all further extravagant schemes, of which electricity is in the van.

Commander Buist makes a point of hydrogenation being more likely to be successful on liquid fuels than on raw coal. From the major aspect of bettering the coal industry, it does not seem material which of the two—liquid or solid—proves the better in the long run; the great point is that coal is needed for either. Commander Buist ends his letter with the observation—"A considerable amount of crude oil is now being distilled from coal by the low-temperature process, and this, when added to the vast quantities of creosote produced by British gas undertakings, is sufficient to provide the raw material for several hydrogenation plants." In the writer's view, Commander Buist should have reversed the order in which he places oil from low-temperature and creosote from high-temperature processes. The creosote is already available from long established and economically successful high-temperature carbonization, and the success is being prejudiced by the difficulty of disposing of creosote. That is a far better reason for supporting research on hydrogenation than the treatment of oils from a process which has yet to make good commercially, though the time may arrive when low-temperature carbonization is able to stand up to claims which have yet to be justified.

"SCRUTINEER."

Aug. 29, 1931.

Purifying Plant at the Wola (Warsaw) Gas-Works

SIR,—Referring to the article in the "JOURNAL" of Aug. 12, pp. 370-376, on the Wola Gas-Works, Warsaw, we feel we should like to mention that the purifying plant described therein was designed by the firm of Aug. Klönne, Dortmund, and manufactured by the Polish firm of Structural Engineers, H. Cegielski, Posen, to the detailed drawings provided by Aug. Klönne. This latter firm also erected the purifiers, and put them into operation.

We mention this fact as we have recently completed negotiations with the firm of Aug. Klönne, Dortmund, for the sole right to manufacture and build in this country their type of purifying plant.

W. J. Jenkins & Co., Ltd.,
JOHN L. BUTLER,
Managing Director.

Beehive Works,
Retford,
Aug. 24, 1931.

THE NEWS OF THE WEEK

Cheaper Gas for Nottingham.—The Nottingham Gas Committee have decided to reduce the price of gas by 0·2d. per therm or 0·95d. per 1000 c.ft. They also determined upon abolishing meter rents, a step which will afford general satisfaction in the City.

The Hastings and St. Leonards Gas Company are paying interim dividends at the following rates (less income-tax): £7 p.ct. per annum on the 5 p.ct. converted stock; £5 10s. p.ct. per annum on the 3½ p.ct. converted stock; and £6 8s. p.ct. per annum on the 5 p.ct. additional stock.

The Premier's New Gas Cooker.—We learn from a daily paper that while spectators had their eyes on the door of No. 10, Downing Street the other day, waiting for the Cabinet to break up for lunch, the door was opened to admit a man who was taking a new gas cooker into the Prime Minister's kitchen.

The Chesterfield Gas Committee have received an application from the Bolsover (Derbyshire) Gas Company for a supply of gas in bulk. The Gas Committee have appointed a Sub-Committee to negotiate with the Directors of the Bolsover Gas Company, and they have been given full powers to act in the matter.

"Gas the Cheapest Service."—This is the heading to an advertisement in the local Press, in which the Hastings and St. Leonards Gas Company announce that, wherever desired, customers can have their gas charged at "per unit" (4000 B.Th.U.). The price per unit is 0·4d., flat rate—no additional or standing charge.

The Research Work at the Belfast Corporation Gas-Works in the provision of motor fuel from coal tar oil is making satisfactory progress, and the new petrol substitute is finding a ready market in the City and province. In addition to the Belfast Omnibus Company, several large private firms are now numbered among the consumers.

The Halifax Gas Committee, following up recent concessions to consumers, have agreed on a reduction equivalent to 6d. per 1000 c.ft. to pre-payment system consumers on quantities over the first 4000 c.ft. per quarter. The Committee have also agreed to grant £100 towards the cost of special illumination in the town during the forthcoming Halifax Publicity Week in October.

The Directors of the European Gas Company have decided to pay on Oct. 1 next an interim dividend of 2 p.ct., free of income-tax.

During a Thunderstorm on Aug. 15 the electric current at Selby was completely cut off, a transformer belonging to the Yorkshire Electric Power Company being set on fire.

The Hebden Bridge and Mytholmroyd Gas Board announce a net profit of £1585, as compared with £845 in the previous year, while the surplus reserve is now over £8000. In presenting the report the Chairman (Councillor A. Sutcliffe) regretted that despite the healthy financial position of the Undertaking a reduction in the price of gas could not at present be entertained as the question of renewals at the works was under consideration.

Forthcoming Engagements.

Sept. 10.—NORTH BRITISH ASSOCIATION OF GAS MANAGERS.—Annual Meeting in Rothesay.
Sept. 15.—INSTITUTION OF GAS ENGINEERS.—Meeting of Gas Education Executive Committee.
Sept. 15.—NATIONAL GAS COUNCIL.—Meeting of Central Executive Board at 28, Grosvenor Gardens, S.W. 1, at 3 p.m.
Sept. 16.—BRITISH COMMERCIAL GAS ASSOCIATION.—Meetings of the Executive and General Committees at 11.30 a.m. and 2.30 p.m. respectively.
Sept. 17.—SOCIETY OF BRITISH GAS INDUSTRIES.—Council Meeting in the afternoon.
Sept. 17.—WALES AND MONMOUTHSHIRE ASSOCIATION.—Meeting at Porthcawl.
Sept. 28-30.—BRITISH COMMERCIAL GAS ASSOCIATION.—Annual Conference at Exeter.
Oct. 9.—NORTH OF ENGLAND ASSOCIATION.
Oct. 14.—EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.—Autumn Meeting in London.
Oct. 20.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—Meeting at 28, Grosvenor Gardens, S.W. 1, at 2.30 p.m.
Oct. 27-28.—INSTITUTION OF GAS ENGINEERS.—Autumnal Research Meeting.

THE NEWS—*continued.*

A Potential Investment.

Tottenham and District Gas Company.

Among the recent Potential Investments recorded in the "Financial Times" the Tottenham and District Gas Company receives attention.

This Company, it is stated, was formed in 1847, and has steadily kept abreast of the progressive development of the 60 square miles of the London suburban area which it now serves. The Company was incorporated by the Special Act of 1859 as the Tottenham and Edmonton Gas-Light and Coke Company, became the Tottenham District Light Heat and Power Company on the acquisition of the Enfield Gas Company in 1914, and assumed the present name on absorbing the Waltham and Cheshunt Gas Company at the beginning of 1929. Powers are now being sought for the transfer to the undertaking of the Hertford and District Gas Company, the Hoddesdon Gas and Coke Company and the Ware Gas Light, Coal, and Coke Company.

The Company also supplies electricity in Wood Green from its own generating station, supplemented by bulk supply from the North Metropolitan Electric Power Supply Company, to a large and increasing number of consumers.

Pioneers in the Gas Industry.

The latest additions to Messrs. W. C. Holmes & Co.'s "Pioneers in the Gas Industry" Calendar, which they have kindly distributed to their business friends are sketches of Frederick Accum (September) and Archibald Cochrane (November), together with brief biographical notes on each.

Frederick Accum was born in Hanover and came to England as a chemist in 1793, establishing himself in a laboratory in Soho. He made a reputation as a pharmaceutical and analytical consultant, and in addition to being the first chemist appointed by the Gas Light and Coke Company, he became a member of the Board of Directors of that Company in 1812. He was the author of several text books on Chemistry.

Archibald Cochrane, 9th Earl of Dundonald, was born in 1749 and was believed to have been the originator of the "Beehive" coke oven. He was regarded as a most ingenious scientific speculator and inventor, who was before his time. In 1781 he was granted a patent for a "method of extracting or making tar or pitch, essential oils, volatile alkali, mineral acids, salts, and cinders from coal. This mode of obtaining tar oils, &c., from coal is in contra-distinction to the method known or used for that purpose—namely, the distillation of coal in closed vessels." Archibald Cochrane died in 1831.

Corbridge Street Lighting.

The Corbridge (Northumberland) Parish Council have decided to spend £200 on street lighting by gas during the coming winter season—an increase of £15 on last winter.

The season will begin on Sept. 20 and end on April 30. The Secretary of the Corbridge Gas Company wrote to the Parish Council quoting for gas lighting, extinguishing, and maintaining 60 lamps for 32 weeks at £3 2s. per lamp. The Council instructed the Clerk to see the Secretary of the Gas Company with the view to obtaining a reduction in the cost.

Recommendations Regarding Gas-Heated Ovens and Furnaces.

The Factory Department of the Home Office has published a Memorandum on the "Dangers attending the use of Gas-heated Enamelling Ovens, Furnaces, &c." (H.M. Stationery Office; price 1d.). In this it is stated that all flue outlets for carrying away the products of combustion of gas should be entirely unobstructed, and any valve in such a flue should be so constructed that it is impossible to reduce the effective cross-section of the flue to below prescribed limits. The outlet of the flue should not discharge direct into the main flue, but should be interrupted, and discharge under a hood connected with the main flue at a point sufficiently high to prevent any operator from tampering with the flue so as to cause an obstruction.

Where the usual form of bunsen burner is employed, it is essential that these be fitted with control taps in a convenient position outside the stoves and protected against accidental mishandling, and that the air injectors of suitable design should also be fitted outside the stoves. Burners should be fitted with inverted V cowls or channels running the whole length of the burner at a suitable height above the flame. Where there are two by-pass burners in an oven, each fitted with its own tap, they should both be controlled by one main stop cock so that if one of the by-pass taps is accidentally left on over-night when the meter is turned off, it will not pass gas to the oven when the meter is again turned on until the main cock is again opened. The main by-pass cock and the main cock for the burners should be close together. Gas holes either on burners or on pilot burner pipes should not be more than $\frac{3}{4}$ in. apart, so as to ensure rapid lighting.

In cases where air under pressure is used in conjunction with low-pressure gas, as in certain forms of gas furnace, a back pressure valve should be fitted on both air and gas mains.

Stamford Gas Lighting Contract.

The Stamford Town Council have signed a five years' contract, subject to a discount of 5 p.ct., with the Stamford and St. Martin's Gas Company for the public street lighting of the borough.

Ald. J. H. Bowman, moving the adoption of the contract, said that street lighting cost nearly a 4d. rate, but he thought the streets were exceedingly well lighted.

One Councillor asked if there were any possibility of getting better terms from the local Electricity Company, and, in reply, Ald. Bowman said the Company had definitely declined to tender. The reason, he said, was obvious; it would involve them in a capital outlay of £11,000 to provide the necessary standards and cables.

Sherborne Company's Successful Year.

Record Consumption.

A record consumption of gas during the past year was a feature of the work of the Sherborne Gas and Coke Company reported upon at the annual meeting of the Company, presided over by the Chairman of the Directors (Mr. T. E. Vincent).

The Chairman, proposing the adoption of the report, stated that the profit on the year's working was £2645, as compared with £3392 the previous year, a decrease of £747, due to the extraordinary expenditure on repairs and maintenance of mains. Proceeding, Mr. Vincent said that the share and loan capital was £20,740, an increase on last year of £610, while the book value of the Company stood at £33,053. The sales of gas showed a record figure of 63,142,400 c.ft., an increase of practically 3 million c.ft., and giving an increased revenue of £531. Additional rebates had been made to consumers of 62,500 c.ft. per quarter of 3d. per 1000 c.ft., and to consumers of 125,000 c.ft. 6d. per 1000.

The Chairman remarked that when he became Chairman of the Directors in 1916 the sales of gas were 38 million c.ft., now they were 63 million.

The profit and loss account, after paying interest on debentures and loans, showed an available balance of £9488, from which amount the Directors recommend a dividend of 5 p.ct. on the preference shares, 10 p.ct. on the ordinary shares, both less income-tax.

British Association for the Advancement of Science.

Chemistry Section.

The Centenary Meeting of the British Association for the Advancement of Science will be held in London from Sept. 23 to Sept. 30, 1931. From the point of view of the Chemistry Section, the importance of the meeting will be greatly enhanced by the arrangements which are being made by the Royal Institution to celebrate at the same time the Centenary of Faraday's discovery of benzene, a compound which has become of the greatest utility, not only as a motor fuel, but as one of the most important raw materials for the organic chemical industry.

The Faraday Celebrations will include an Exhibition in the Albert Hall to demonstrate the remarkable industrial developments that have accrued from Faraday's fundamental studies in the electrical and chemical fields. One-fifth of the total space will be devoted to the chemical aspects of his work, the rest being allotted to his electrical discoveries. Faraday's discoveries in many branches of chemistry and physics were so numerous and fundamental that it is difficult to determine which was the most important; but the Exhibition, by dealing with his main investigations, will constitute a remarkable demonstration of the manner in which new industries have arisen from his researches which, in the realms of chemistry, include

the liquefaction of gases, alloy steels, electrolysis, catalysis, and benzene. Very appropriately, Sir Harold Hartley will devote his Presidential Address to the Chemistry Section to Michael Faraday, with particular reference to the developments in the theory of electrolysis and electrolytic conduction which have originated from Faraday's pioneering work on this subject.

On Sept. 28, the section will hold a symposium on "The British Fuel Problem," to which contributions on coal, oil, and future possibilities will be made by distinguished authorities in these particular fields. The object of the symposium is to present the British fuel problem in simple and non-technical language for the benefit of the general public, in order that they may have an opportunity of learning the correct facts of the case and of rectifying any false impressions that may have arisen from the mass of misleading information which has been written and published on this subject.

On Saturday morning, Sept. 26, there will be a visit to the Research Laboratories and Works of the Gas Light and Coke Company at King's Road, Fulham, S.W. 6, followed by a lunch given by the Governor and Directors of the Company at the Head Office, Horseferry Road, S.W. 1.

Ten Employees Retire with 340 Years' Service to Their Credit.

Ten co-partner employees whose retirement from the South Metropolitan Gas Company is announced have an average period of thirty-four years of regular service to their credit.

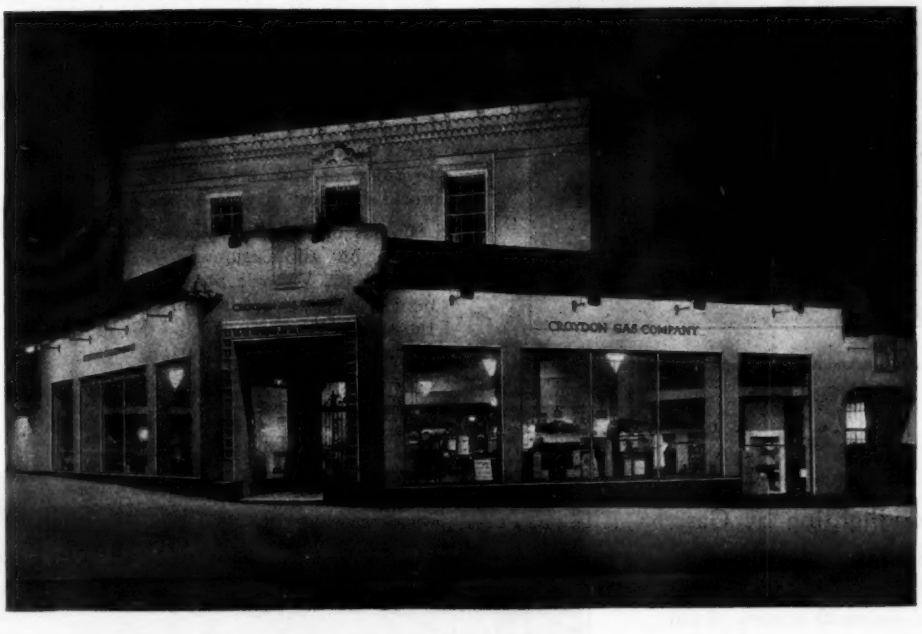
They include Mr. H. Day, Chief of the Slot-Meter Department, who joined the Company when fourteen years of age and who is retiring after fifty years' service. Four others have each more than forty years' service to their credit.

All these co-partners come under the Company's pension scheme which was established by the late Sir George Livesey.

FLOODLIGHTING OF - - - WALLINGTON SHOWROOM

Described as one of the lightest spots in Wallington after dark

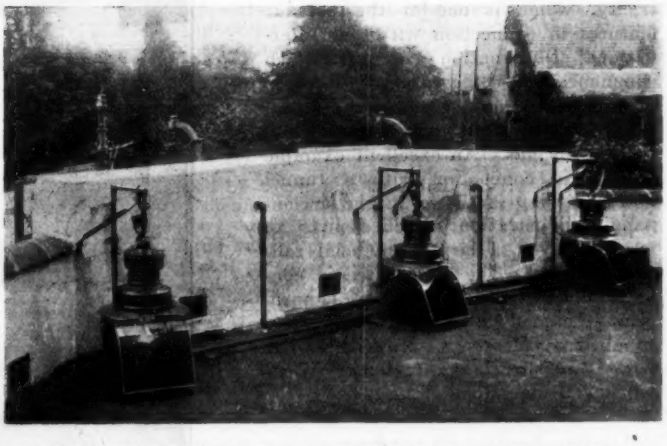
[From the "Croydon Co-Partner"]



One of the lightest spots at Wallington after dark is the showrooms of the Croydon Gas Company, recently erected at the corner of Stanley Park and Woodcote Roads (described and illustrated in the "JOURNAL" for March 26, 1930). The building, which was designed by Mr. A. Douglas Robinson, A.R.I.B.A., has an external design of a Spanish character, having white plastered walls and restrained carving to the window surrounds.

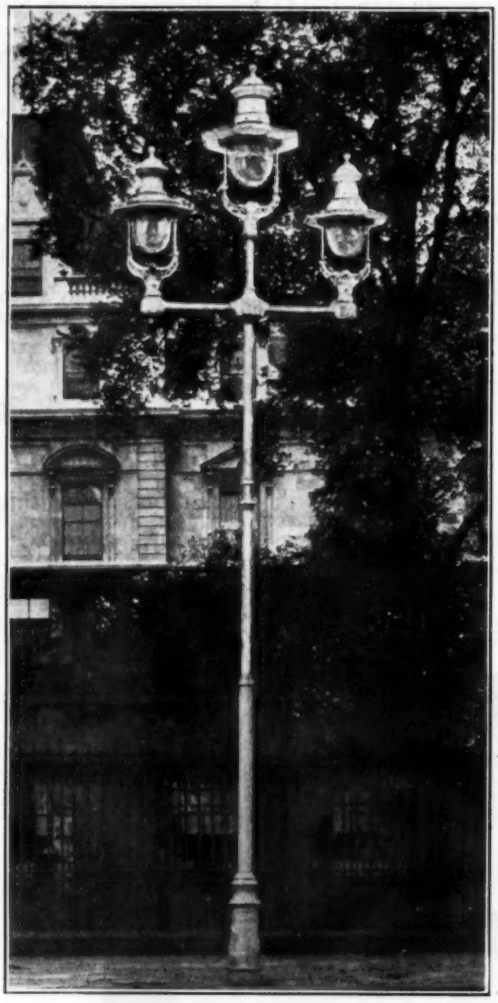
The front of the upper floor, which constitutes the Lecture Hall, over the showroom, is now floodlighted by gas, and the fascia and pavement are illuminated by lamps fitted with special globes and parabolic reflectors.

The lower illustration shows the special reflectors which are designed to throw the light upwards, fitted on the inside of the parapet. The whole effect is pleasing, and has been met with a good deal of favourable criticism locally.



LAMPS ILLUMINATING THE EXTERIOR OF THE LECTURE HALL.

International Illumination Congress



Keith-Blackman H.P. Lamps in Whitehall.

High-Pressure Gas Lighting in Whitehall.

This length of street is being lighted by 87 high-pressure lamps, which are mounted on 29 columns, each column carrying three lamps. It is anticipated that the minimum illumination at the test points will be about 2½ foot candles. A special feature is that Class A illumination will be produced without the aid of any directional reflectors. We confidently anticipate that Whitehall in September will be one of the finest pieces of propaganda the Gas Industry could enjoy.

A Book About London.

The London Committee of the International Illumination Congress has prepared a special book on London which is available with a French and German translation for the foreign visitors. This unique production, entitled "A London Symphony," includes a frontispiece reproduced by the gracious permission of His Majesty from a water colour of Buckingham Palace in the Library at Windsor Castle.

It includes 17 articles, and there are forty-five pen sketches, six whole page illustrations by Mr. W. James, and three interesting maps—one of the shopping district of London, one of the River Thames, and one of the world. A list of the principal English and foreign churches, theatres, museums, art galleries, &c., has been added.

The articles, each written by a well-known expert in his respective field, are short and give a remarkably interesting picture of London. This book in the hands of a foreigner, with the appropriate translation, should do a great deal to remove misunderstandings and call attention to some of the outstanding features of the life of the world's largest city.

Copies of this book, price 3s. 6d., are available to the public on application to the Illuminating Engineering Society, 32, Victoria Street, S.W. 1. With French or German translation added, price 4s. 6d. Any proceeds from the sale of the book will be devoted to the encouragement of the Science of Illumination.

Indoor Floodlighting by Gas.

A Subway Display.

While so much interest is being evinced in the elaborate system of outdoor floodlighting by gas and electricity, which is one of the popular features in connection with the International Illumination Congress which commenced its proceedings yesterday, it may not be out of place to call attention to the possibilities of indoor floodlighting by gas. An excellent example of this in connection with a tunnel poster display is shown in the accompanying illustration, which depicts an installation at a large provincial railway station. The lamps used in connection with the scheme are appropriately named the "Poster," and were supplied by Messrs. C. H. Kempton & Co., Ltd., of Stangate House, Westminster Bridge Road, S.E. 1.

IN CONTINENTAL COUNTRIES - - -

Abstract Translations from the Technical Press of France and Germany.

DETERMINATION, TRANSFORMATION, AND REMOVAL OF THE ORGANIC SULPHUR OF GAS.

The researches undertaken in connection with the production of sulphur-free gas for use in the synthetic manufacture of liquid fuels by the Fischer process are described by O. Roelen in "Brennstoff-Chemie," 1931, 12, 305-312 (Aug. 15).

For the determination of small quantities of sulphur compounds in highly purified gas, large volumes of the gas must be employed. Methods involving combustion of the gas over a platinum spiral in a silica tube and subsequent oxidation of the sulphur dioxide by hydrogen peroxide in bottles provided with a sintered glass diaphragm were investigated. The use of a large silica tube and a wash bottle of the type indicated enables an economy in the time required for the determination to be effected, since it is possible to burn as much as 3½ c.ft. of the gas in an hour. The method has, however, the drawback that the silica tubes are quickly attacked, and the results obtained are low. Hence a new method, a description of which will be published later, was employed.

Investigation of various catalytic methods for the conversion of the organic sulphur compounds into sulphuretted hydrogen, which can then be removed, showed that purification was not complete. The use of iron (originally proposed by E. V. Evans) or silver as catalysts gave good results on a laboratory scale, but on a large scale it was not possible to maintain complete purification over a long period. After a month, the organic sulphur content of the outgoing gas would rise to a figure as high as 0·4 grains per 100 c.ft. This was the case whatever the form of the metal or the arrangement of the reaction vessel. Investigation showed that this was due to the reversible nature of the reaction. During use, the iron becomes pulverulent and fine dust is carried forward out of the reaction vessel into the exit tube. This dust gives rise to re-formation of organic sulphur compounds—*e.g.*, carbon bisulphide and carbon oxysulphide. Formation and subsequent decomposition of iron carbonyl with production of iron is responsible for a similar result even when a silver catalyst is employed if the gas has come into contact with iron. Sulphided iron may also promote re-formation of organic sulphur compounds. The concentration of organic sulphur compounds introduced through this reverse action depends on the temperature, but is lowest in the temperature range (350-400° C.) most suitable for the purification reaction.

The solution of the difficulty was to cool the gas with a water spray immediately after treatment without making use of the sensible heat of the treated gas for preheating the ingoing gas. As a result, the production of a gas containing not more than 0·04-0·09 grains of sulphur per 100 c.ft. was maintained for more than a year. It is only necessary, from time to time, to blow out of the reaction tube any accumulation of dust or to remove it by other means.

Production of gas practically free from sulphur involves removal of the original sulphuretted hydrogen by the usual method, catalytic reduction of the organic sulphur compounds to sulphuretted hydrogen and subsequent removal of the latter. For removal of the sulphuretted hydrogen in the last stage, oxide purification cannot be employed, one reason being that iron oxide gives rise to further formation of organic sulphur compounds due to the activity of certain bacteria. An alkaline solution of potassium ferricyanide is therefore used [see "JOURNAL" for Aug. 19, p. 422].

UNIFORMITY OF - - ELECTRICITY TARIFFS

How the Report of a Committee of the Electricity Commissioners affects the Gas Industry

By "ENGINEER"

(*Concluded from page* 482.)

REQUIREMENTS OF A TWO-PART TARIFF FOR DOMESTIC PURPOSES.

The recommendations in this respect might have been written for the gas industry with equal force. The various forms of charge have all been reviewed, but it is considered that the following conditions should be satisfied in the form of tariff ultimately adopted.

(*a*) The total amount of the individual fixed charge parts of the tariff should provide the necessary revenue to meet the "standing charges" of such customers as the tariff will or may apply to.

[The gas industry may not agree on the Committee's definition of "standing charges" which comprises those charges which have to be incurred independently of the output of electricity, and includes "capital charges (or loan charges), rent, wages, the ready to serve or service charge, cost of such apparatus as meters, maintenance, meter reading, accountancy, &c."]

(*b*) The basis for assessment for the fixed charge should be available to consumers, and should not be subject to adjustments which are not disclosed.

(*c*) The secondary or unit charge should be as low as possible. [If the full measure of the standing charges as indicated under (*a*) is taken, the commodity or secondary charge should indeed be low.]

(*d*) The tariff should be simple in character, adaptable to any type of domestic consumer, and equitable to consumer and supplier.

(*e*) It should involve the minimum of expenditure on meters, &c., and the same for the installation expenditure on the part of the customer.

(*f*) It should not entail periodical or unexpected visits of inspection to the consumers' premises. The allocation should have regard to the consumers' premises as a whole. [This last section is somewhat doubtful in the writer's view, whether applied to the gas or electrical industry, without qualification. If the term premises is applied to the premises as served, or coming under the review of the tariff, then the recommendation can be accepted.]

VARIOUS BASES FOR THE STANDING CHARGE CONSIDERED.

The various ramifications of the rateable value basis for the calculation of the fixed charge, both with and without variable charges per unit of current consumed, are considered.

It is agreed by the Committee that the rateable value is not by any means a reflection of the electrical demand of those premises, and there are many factors contributing to rateable value which have no bearing on either electrical demand or cost of supply (take position of premises as a simple example). Not only in the same town, but in neighbouring streets, identical premises (as far as electrical supply is concerned) may have widely differing rateable values.

The Committee appointed in 1925 were attracted by a "weighted" or compensating method of adjusting rateable values to the basis for a fixed charge, by which a standing charge was arrived at without telling the consumer that the rateable value was the ultimate basis.

This Committee rightly condemn the method, and in fact

any method which does not disclose adjustments, and they evidently do not agree with the earlier conclusions that " the public are not particularly interested in how the charges are arrived at."

It appears to the writer that it is unsound to tamper with rateable values by classification and adjustment when a more suitable measure is at hand—*i.e.*, the size of the house, such as the floor area or number of rooms.

The gas industry, as well as the electrical, must make up its mind definitely whether the fundamental consideration is to be what the consumer would take if he lighted and heated his premises according to the supplier's ideas, or whether it is to be the *actual* demand he makes on the supplier. If the two are nearly enough the same, then there is nothing more to be said, but it is only in rare cases that they are. Take, for instance, any case of a ten-roomed house, or a house of 3000 sq. ft. on two floors. If we start off on the basis that the consumer should have electric lighting, one electric radiator, two regular gas fires, three occasional gas fires, one coal fire, gas cooking, and a combination of gas and coal for the hot water from taps, then both electricians and gas people would find a comparatively simple problem before them. The floor area method seems to imply some such assumption as that above. Now assume the customer says to the electrical supplier: Electric lighting only, then the floor area assessment basis is only correct as long as all similar sized houses are supplied for lighting only. In the same way, if there is only a gas cooker, then the gas supplier would be equally adrift in calculating the standing charge on the basis of house size, unless the standing charge is meant to be the " customer " charge only, and that with a very limited interpretation of what are customer charges. The manufacturing and distribution demand charges must all go to the commodity element in a two-part charge if this method of assessing the standing charge is to be proceeded with.

In a four-part tariff as such the customer charge is perfectly clear cut and independent of the size of the premises. In the two-part tariff as generally understood the customer charges includes distinct parts of the distribution and manufacturing demand charges, and in this the demand counts; in general the size of the house has a distinct bearing on the demand, and if the term " standing charge " is to be so comprehensive as this Committee indicate, an error in basis of computation might be grossly unfair as between different kinds of consumers.

However, the Committee are against the rateable value principle without adjustment, and even after adjustment do not recommend it for compulsory two-part tariffs.

The lighting wattage installed is also considered as a basis, and the objections are fully considered. What appears to be a simple basis is full of practical objections, one of which is regular inspection, another the tendency to keep a low standard of illumination, and keeping occasional rooms and landings unwired. Disputes are likely to arise, and on the whole the system is not recommended.

The block or step method is dismissed as only a part-way house towards a two-part tariff, and the report says: " This tariff does not therefore conduce to the use of electricity for other than lighting purposes." The basis of maximum demand is also considered, and, in the writer's opinion, dismissed too lightly as being unsuitable. The Committee state that based on years of experience the presence of a special demand instrument is a constant worry, as one realizes that one will be penalized by a single abnormal demand. If the reason for a higher charge is the higher demand, it appears logical that abnormal demand is a justification for a higher charge, but the system should be flexible enough to prevent this feeling on the part of the consumer, and to meet it when it arises.

The number of rooms basis is considered unsuitable because rooms vary so much in size, and this objection seems logical whether we are dealing with lighting or heating.

The size of house basis is then considered, and finally a number of composite forms made up of combinations of any of the aforementioned.

It is the size of house basis which appeals to the Committee (such as floor area or outsize dimension area). This basis is considered to offer the following advantages:

(1) The floor area is related to the consumer's probable demand.
(2) This basis does not restrict the size of the installation.
(3) It entails only one inspection of the premises.

Now if (1) is true, the economics of the situation is satisfied. On the other hand, statements (1) and (2) do not seem to be reconciled. If the floor area is really a measure of the demand, then the size of the installation is restricted. If under (2) the basis does not restrict the size of the installation, then the floor area by itself has no significance in regard to demand, and a customer charge should be calculated either on (2) only, or a combination of (1) and (2). Lack of restriction on the installation implies equal lack of restriction on the maximum demand, and therefore the floor area is not " related to the consumer's probable demand."

Probably the Committee mean to point out that in comparable cases the size of the house has some bearing on the total or maximum hourly demand, and therefore it can form the working basis for a tariff, acceptable by both parties, and attractive to the consumer because he can add further appliances without extra cost. Nothing short of moving or building further rooms can add to his standing charge.

The simplicity of the system has much to recommend it. The size of the house may be a closer measure of demand for electricity than for gas. We know that the small houses are often first-class gas consumers, while large houses may be very poor ones. If our policy is to get the consumer to pay on the basis of what he *should* consume as a normal customer, then the size of house basis is exceedingly attractive.

In his Institution paper of 1926, Mr. McLusky, of Halifax, gave examples of consumption in various classes of house, and the charges based on floor area. He gave (among others) cases of a three-roomed house taking 128,000 c.ft. per annum paying a fixed charge of 9s. 9d. per quarter, and a six-roomed house taking 121,000 c.ft. per year paying 16s. 3d. per quarter. The two loads must have been almost equal, so this example shows a possible weakness when applied to gas supply on a compulsory basis.

However, with all its defects, the Committee on tariffs under discussion unanimously recommend the adoption of the " size of house " method for the calculation of a two-part tariff, but no evidence appears to have been put before them of the effect on the finances of an undertaking of doubling the peak loak by the addition of appliances, although the two-part tariff is unhesitatingly recommended with a view to increasing the sale not only for lighting, but " also for cooking, heating, water heating, and other labour-saving devices."

The significance to gas men, however, is the fact that this report is made to a body with the powers of a Government Department, and the following recommendations are made forcibly and unanimously.

(1) A standard two-part tariff should be introduced for general domestic supplies by all undertakings.
(2) The consumer should be educated as to its necessity and object, and the attraction it has in lowering average prices when the advantage is fully taken.
(3) The size of house basis for the standing charge is the one which is most favourable, and all undertakings should fall into line—*i.e.*, there should be complete uniformity.
(4) The Committee endorse the opinion of the 1925 Committee to the effect that no multi-part tariff has yet been devised or suggested to them which in their opinion is suitable as a statutory method *unless coupled with an option to the consumer to be charged at a flat rate.*

The report, however, goes farther than this. In retaining for the consumer the option to be charged on the flat rate, the Committee emphasize the necessity of making each action of the business self-supporting, and they recommend that it should be open to the supply authority to charge such a flat rate as will secure from the short hour lighting consumers on the flat rate the full amount of revenue required to meet the cost of the current supplied and the standing charges, and by inference they advise a wide discrimination between the charges for lighting only and for general domestic purposes, even if both are on the flat rate basis.

They also recommend that the flat rate for other domestic uses (what may be called the lower flat rate) should still be higher than the unit charge forming part of the two-part tariff.

Finally, before dismissing the question of domestic consumers, the Committee make the two following endorsements of the recommendations of the 1925 Committee:

(*a*) To protect the undertaker the flat rate should be sufficiently high to induce a consumer in his own interests to adopt the two-part tariff.
(*b*) Multi-part tariffs by agreement with the consumer were of little use and would not achieve their object unless the alternative method was a relatively high flat rate.

It behoves a gas man with revenue to spare therefore either to save it or use it in giving advantageous terms to consumers under a two-part tariff.

The Committee deal with office and business premises, border line cases, prepayment meters, rural premises, and industrial demands, but this article is sufficiently long

already, and enough has been written to indicate the importance to the gas industry.

PREPAYMENT METERS.

With regard to prepayment meter charges, the Committee see difficulties in the application of the minimum quarterly payment to this class of consumer.

A further recommendation is that consumers on the prepayment system should be informed how much of the charge is for current only, how much is incidental to the prepayment meter and method of collection, and how much due to wiring charges and other extraneous items.

Finally, it is agreed that the charge for the electricity should be equal to that of the ordinary consumer, and general reductions in price should apply to each class. The additional charge for the prepayment installation should not exceed 25 p.ct. of the actual flat rate charged to ordinary consumers in similar circumstances.

It would appear from these recommendations that the prepayment meter problem is not (in the view of the Committee at any rate) an important one. The charge may be sufficient when applied to a 10d. rate where a meter only is supplied, but be quite inadequate if applied to a 5d. rate where wiring and other installation work is provided in addition to the meter. If the prepayment meter consumers constituted over 50 p.ct. of the total, the matter could not be treated in this casual manner.

It is interesting to note that no attempt is made to frame or even consider the introduction of a two-part charge for the prepayment consumer.

Regarding the various methods of two-part tariff charges the Committee make no mention of a system in vogue for certain classes of house—viz., a weekly sum charged on the rent *plus* a unit charge, the collection being in the hands of the landlord. It may be argued that this is only a variant on the "size of house" system, seeing that it is applied generally to houses of similar size.

Take, for instance, the weekly payment rate at the Welwyn Garden City. A landlord owning a group of 50 houses or more agrees to collect the electrical standing charge in the rent. In cases of houses not exceeding 18s. 6d. per week exclusive of rates, a weekly charge of 1s. is added (1s. 4d. per quarter is allowed to the landlord for collection). The rate for current is then 1d. per unit, and the cooker rent is 7d. to 9d. per week according to size, with the addition of 1d. per week for a kettle. A shilling in the slot meter is provided. This tariff can be so "dressed" as to convince a prospective consumer that for all-in purposes electricity on this system is cheaper than gas. The result, of course, entirely depends on the needs of the household, and whether the same degree of comfort or service is demanded from the electrical installation as would be thought adequate in the case of gas.

The Committee whose report forms the subject-matter of this article consisted of six members, all representing electrical supply interests, of decided ability in their respective spheres, and the witnesses mostly from the supply side of the business. The one weak point, in the writer's opinion, is that no evidence was taken from the man in the street or any qualified representative on his behalf. If the gas industry get a committee of this kind it would be desirable to have councillors, officials of ratepayers' associations, local "improvement" associations, or even individuals with opinions. This would be good for the work of the Committee, good for propaganda, and would assist in the education of the public and those who represent the public.

GAS SERVICE - - -

Discussed from the viewpoint of the Gas Salesman

Should Advertisements State the Price?

Mention was made of this much-vexed question in a paper which Mr. P. Wilson, Showroom Manager to the Harrogate Gas Company, read before a meeting of the West Riding Salesmen's Circle (published in the August issue of the "Gas Salesman"). Regarding newspaper advertising, Mr. Wilson appreciates the difficulty when almost every town has a different scale of charging both for gas and the appliance; he suggests, however, that it would be of advantage to the Industry if some uniform system could be devised—(say) where a 7-radiant fire could be quoted at £3 5s. fixed, including piping to a certain length, (say) 20 ft. He is of opinion that price has a large bearing on any article, if quoted when advertised, although some feel that the price should be the last thing mentioned when effecting a sale. The first question of a customer to-day, however, is—and it is not to be denied—"What will that cost?" Mr. Wilson remarks that people would consider more seriously before going to our competitors if a quotation could be given thus—"This fire with seven radiants will cost, with gas at 9d. per therm, less 10 p.ct. cash discount, 1¼d. per hour."

We should endeavour to retain and increase our heating load, says Mr. Wilson, by some means of collective advertising giving both cost of the appliance and its consumption per hour with gas at an average price. He appreciates the advertising done by the British Commercial Gas Association and also that of the stove manufacturers; but, he asks, do the advertisements give the public sufficient idea of the cost of the appliance and its consumption, in comparison with other forms of heating?

Refrigeration Displays.

A contributor in the August issue of the "Gas Salesman" refers to some very effective refrigerator displays—one in particular being in an ironmonger's shop. It was designed in a three-colour scheme—grass green, white, and silver—colours chosen to convey the impression of coolness, cleanliness, and freshness—the essentials of the refrigeration story. A white refrigerator stood on a grass green mat, and behind it was crêpe paper arranged in rays shaded from light to dark greens. Splashes of vivid hues were introduced by packing the refrigerator with empire produce, fruits, vegetables, &c. A large silver showcard stood on each side of the refrigerator with lettering in green. One read, "Do You Want a Refrigerator? Of course you do!" then a few details explained why. The second card asked, "Can You Afford a Refrigerator? Of course you can!" then a concise message followed explaining how.

The very simplicity of this display was a selling point. There was nothing in the window to distract the mind of the observer from the one story the display was designed to tell—namely, why refrigeration was an asset in the modern home and how it was to be obtained.

"Metro" Service - An All-Gas Flat.

Illustrations appearing in the August Co-Partnership Magazine of the South Metropolitan Gas Company demonstrate another phase of "Metro" service—the "Toil-Free" flat, recently opened in the furniture department of Messrs. H. Holdron, Ltd., of Rye Lane, Peckham, S.E.

The suites of rooms, comprising dining-room, sitting-room, and kitchen, fully equipped to demonstrate the services rendered by gas in the home, that have been established in some of the principal stores in South London, are evidence of the Company's forward sales policy. The sitting-room has an attractive inset gas fire, together with beautiful lighting fittings, of standard, pendant, and bracket types, while in the dining-room is a "Metro" coke fire, gas ignited, and similar attractive lighting fittings. The sitting-room also has a gas "smoker's companion" beside the fireplace. In the kitchen are examples of all the gas labour-saving devices required in the modern home—cooker, refrigerator, wash-boiler, and instantaneous and storage water heaters, besides a gas iron and suitable lighting fittings. Incidentally, the kitchen is utilized for cookery demonstrations, which are the means of attracting many visitors and are a special feature of the "Metro" advisory service.

The idea of a gas undertaking co-operating with the furniture department of large stores in this way, of course, is not a new one, but is one, nevertheless, which could be much more widely adopted to the mutual benefit of the stores and the gas undertaking—for the one gains by having attractive lighting and heating equipment to harmonize with the furniture display, while the other has a suitable setting in which to show the gas apparatus to the best advantage.

BUNKER OILS . . . FOR CARBURETTING*

Mr. R. F. DAVIS, of the Indiana Electric Corporation, gives the results of tests carried out at the Fort Wayne Plant

As practically 60 p.ct. of the total water gas production costs in various plants under our supervision is for oil and fuel, we are naturally very much interested in trying to reduce these costs. Because of the location of the Fort Wayne Plant, we have endeavoured to operate with a minimum of smoke, which precludes the use of coal for generator fuel and leaves improved efficiencies and the use of a lower grade of oil as the only means of reducing these costs.

The Western Gas Construction Company, located in Fort Wayne, are interested in the development of apparatus for the manufacture of gas in the most efficient and economical manner. At a Conference held in September, 1930, they agreed to join us in a series of experiments to determine what results could be obtained along the following lines:

(1) What changes, if any, would be necessitated in existing apparatus for efficiently using fuel oils in place of the gas oils which had been used heretofore.
(2) To ascertain the delivered price and efficiency of various low-grade fuel oils.
(3) To determine what effects the use of low-grade oils would have on the cost of finished gas, giving due consideration to the disposal of the tar produced by this method of operation.

In undertaking this test, we planned to make as little change as possible to the standard Reverse Air Blast machine as operated at Fort Wayne for the last five years, which has demonstrated considerable ability to remove carbon from the checker brick.

The first problem, deciding on what oils to use at the plant, required that laboratory tests be run on various grades and the cost of these oils delivered by rail to Fort Wayne determined. After running preliminary cracking tests on eleven grades of these oils, two were chosen for plant tests. Data are given later covering four typical oils tested. Plant tests were conducted on oils A and B which appeared, from analysis and other considerations, to be most promising.

After selecting these two oils, the conditions under which they could be applied for carburetting purposes were determined more completely in the laboratory. The potential supply and price differential which could be expected were also investigated. From the analyses it will be noted that these oils are of higher coke content than fuel oils which have been used in the east; however, due to railroad rates, we did not feel that eastern oils could be used economically.

The equipment used in this series of tests consisted of a standard 9-ft. Western Gas Construction Company water gas machine, equipped with automatic control and reversed air blast connections. The only additional equipment originally installed for the tests consisted of:

(*a*) A 15,000-gallon fuel oil storage tank.
(*b*) A 15,000-gallon tar storage tank.
(*c*) Tar pumps and piping from tar separator to tar storage tank.
(*d*) Oil pump and piping from oil storage to set and return.
(*e*) An oil heater.
(*f*) A spray in the generator, and necessary piping with meter.

Items (*a*) and (*b*) were installed in order not to conflict with the operation of other machines which were retained as standby equipment on gas oil during the test period.

Checker Bricks Re-arranged.

Realizing that the normal checkering used in our carburettor for gas oil would probably be of such spacing and arrangement as to offer too great a surface and that the openings were of such size as to become readily closed by carbon deposition when using heavy oils, the checker bricks were re-arranged. Since the major portion of the vaporization of oil is accomplished in the carburettor, with subsequent greatest carbon deposition occurring therein, and the superheater used primarily as a "fixing" agent, during our first tests the superheater checkering was not changed. After testing the first type of oil, it was thought that this normal checkering used in the superheater was offering excessive resistance to the passage of gases through the machine, and accordingly these bricks were re-arranged to reduce this resistance. However, when the superheater was opened and the brick re-arranged, it was not necessary to use any new bricks for re-checkering as those removed were free from carbon.

From laboratory cracking tests, a special operating cycle was determined for the use of the first type (A) of fuel oil to be used in the plant tests. It was found that the cycle so determined did not deviate to any great degree from normal operation, with the exception of a longer time being allowed for the reversed air blast. This longer reversed air blast period was found to be necessary for the removal of carbon from the checker bricks.

After a period of several trial runs to familiarize the operators with the new conditions, a prolonged run of seventeen days' duration was made, during which time 30,378,000 c.ft. of 515 B.Th.U. gas was made. During this period, the operating cycle was practically unchanged; changes, however, were made in proportion of oil to carburettor and generator. This varied from 43 p.ct. to 51 p.ct. in the carburettor and from 57 p.ct. to 49 p.ct. in the generator. Average results obtained during this period were 3·75 gallons of oil and 23·5 lbs. of fuel (coke) per 1000 c.ft.

During this period of operation, some smoke troubles were encountered. Proper adjustment of the blasting period and secondary air admission eliminated this trouble during the major portion of the seventeen days of running. Toward the last few days of this period, however, this trouble again appeared and could not be overcome as previously. The set was then shut down, and inspection of the carburettor showed that in a section approximately 3 ft. in diameter, the openings between the top few rows of checker bricks were closed with carbon.

As up to this time no arrangements had been made for the disposal of the tar produced, it was decided that some attempt should be made to use it in the generator, and thereby accomplish not only a means of disposal, but also obtain an additional saving in fuel.

Similarly, it was thought that if a greater proportion of the oil was used in the generator, the carbon deposition on the carburettor checker brick would be lessened. A second test was then made with the following changes:

(*a*) Using a greater proportion of oil to the generator.
(*b*) Using tar in the generator.

After operating approximately a week with the above changes, the fuel consumption was higher than in the previous test, and it was more difficult to maintain fire conditions in the fuel bed. The increased fuel consumption was attributed to the use of tar in the generator, and accordingly this was discontinued. Results from this second period of tests did not indicate that any decided advantages were to be obtained from the use of tar in the generator.

Tar disposal is of economic importance in the use of any oil for carburetting purposes, and since at present the tar companies have not developed a ready market for the tar produced from fuel oils, two outlets for such tar have been investigated. The first is its use in road building. A quantity of tar produced during these tests was given to the State Highway Department for test purposes. No results have been obtained due to the discontinuance of road work in the winter season. The second outlet which seems to offer possibilities is the use of tar as boiler fuel. Results obtained on three small heating furnaces show that with a coal cost of $3.50 per ton in bunkers, a value of three cents per gallon may be applied as tar credit. Approximately a gallon of tar is produced per 1000 c.ft. of gas when using heavy fuel oils; therefore, a tar credit of three cents per 1000 c.ft. may be derived. Estimates are now being prepared covering the cost of equipment for,

* A.G.A. Joint Production and Chemical Conference, Philadelphia, May, 1931.

and the economies to be obtained by, burning tar in one of the gas plant boilers.

Tests with a Cheaper Oil.

Near the end of the second series of tests, a cheaper oil, type B, was obtained, and a third series of tests were conducted using this lower priced oil. Before starting tests with this second type of oil, the carburettor and superheater checker bricks were changed, the major change being the enlarging of the openings in the superheater checkerwork. As this oil presented different characteristics under laboratory cracking tests, a new cycle and a change in temperature conditions were used. Upon starting the third series of tests it was found that carload shipments of this new type of oil did not check the original sample submitted to the laboratory, the carbon residue content being greatly in excess. The net result of this difference in carbon content, along with changes made in operation, was the comparatively short life of the carburettor checker bricks. This matter was immediately brought to the attention of the oil company, and subsequent shipments agreed more closely with the original sample. Laboratory cracking tests were then made on car shipments and a new set of conditions evolved for the use of such oil; however, again no major changes were found to be necessary.

The carburettor was re-checkered and a fourth series of tests conducted. For this series of tests a method had been arranged whereby a greater air supply could be furnished to the carburettor and superheater. At the start of this fourth series of tests, there was still a supply of the high carbon oil. Inspection of the carburettor showed that, in this fourth series of tests, the checker bricks were entirely clean after using as much of the high carbon oil as had been sufficient to cause serious carbon deposition in the third series. The use of the additional air (previously mentioned) had accomplished this thorough carbon removal. This additional air to the carburettor was at the expense of sufficient generator air, resulting in lower generator fire temperatures and less effective vaporization of the oil in the generator. Tests were suspended until a few alterations could be made to permit the use of a still greater amount of air in the carburettor and superheater, and at the same time obtain proper temperature conditions at the top of the fuel bed.

The above gives progress of work to date. Definite conclusions and compilations of results can only be made after more work has been done. We hope to be able to present more complete data at a later date.

From results obtained we believe that checker bricks can be kept clean and that an appreciable saving in generator fuel can be effected when using heavy fuel oils.

Considerable work is being done in Michigan on the use of Michigan crude oils for carburetting purposes, and a report on this work will be forthcoming in the near future.

Appendix A.

Oil.	Oil A.	Oil B.	Oil C.	Oil D.
Baumé, at 60° Fahr.	18·4	14·9	12·4	6·4
Sp. gr., at 60° Fahr.	0·943	0·960	0·983	1·046
Flash point, ° Fahr.	..	284	..	295
Fire point, ° Fahr.	..	406	..	361
Carbon residue, p.ct. by weight	11·0	11·5	..	22·5
Viscosity Saybolt Furol, at 122° Fahr.	29·4 sec.	129 sec.	599 sec.	223 sec.
Distillation, p.ct. by weight—				
450–500° Fahr.	0·2	0·2	..	..
500–550° ,,	3·0	0·1	0·2	..
550–600° ,,	8·2	0·4	0·6	..
600–650° ,,	6·6	0·7	3·3	0·4
650–700° ,,	6·1	1·7	6·1	4·3
700–750° ,,	7·5	8·2	13·1	15·4
750° Fahr. up	68·4	88·7	76·7	79·9
B.Th.U./gall. to gas (by laboratory cracking test)	86,366	86,730	86,899	58,394
Tar.				
Yield, p.ct. by weight/oil used.	27·0	29·8	26·2	39·0
Free carbon	3·3	..	..	..
Sp. gr., at 60° Fahr.	1·118	1·14	1·04	1·13
Viscosity, 50 cc. at 40° C.	40·9	..	..	..
Distillation—				
P.ct. by weight to 170° C.	2·5	..	..	..
,, ,, ,, 200° C.	3·1	..	..	..
,, ,, ,, 210° C.	3·2	..	..	..
,, ,, ,, 235° C.	5·2	..	..	..
,, ,, ,, 270° C.	14·6	..	..	..
,, ,, ,, 300° C.	23·5	..	..	..
,, ,, ,, 315° C.	28·4	..	..	..
,, ,, ,, 335° C.	35·3	..	..	..
,, ,, ,, 170° C.	47·5	..	..	..
,, ,, ,, residue	52·5	..	..	..

GLOVER-WEST VERTICALS IN CANADA

A Carbonizing and Bye-Product Plant Contract secured by West's Gas Improvement Company in Belleville, Ontario

[From "West's Gas"]

Occupying a situation of remarkable natural beauty at the confluence of the River Moira and the Bay of Quinte, on the north shore of Lake Ontario, the city of Belleville, with a population of 13,000, holds a position of considerable commercial importance.

Modernized Equipment.

The gas plant is owned by the city and consisted of a small Tully plant and an auxiliary water gas set. In 1927, Mr. Wynne-Roberts, the well-known Consulting Engineer, was called in to give advice on modernizing this existing equipment. In 1928 a gasholder and carbonizing and bye-product plant were contracted for. The new holder is of 150,000 c.ft. capacity and of the column-guided type manufactured by Horton Steelworks, Ltd. The new purifiers comprise four elevated boxes, each 16 ft. by 10 ft., with two layers of oxide in each, the bottom layer 15 in. thick and the top layer 18 in. thick. These were also manufactured by the Horton Steelworks, Ltd.

The contract for the new carbonizing plant and bye-product plant was entrusted to West's Gas Improvement Company. The carbonizing plant consists of four 33-in. Glover-West ovens in single units. Coal of nut size is emptied from bottom-opening railroad cars into a receiving hopper and elevated to the overhead bunkers by means of an apron conveyor and gravity discharge elevator. A 50-ton coal storage hopper also is located outside the building which feeds back to the receiving hopper. The oven bench is of standard design with two step-grate producers, one to be used as a standby. The waste gases from the bench pass through a natural-draught fire-tube boiler, which supplies sufficient steam for the whole of the works during the summer.

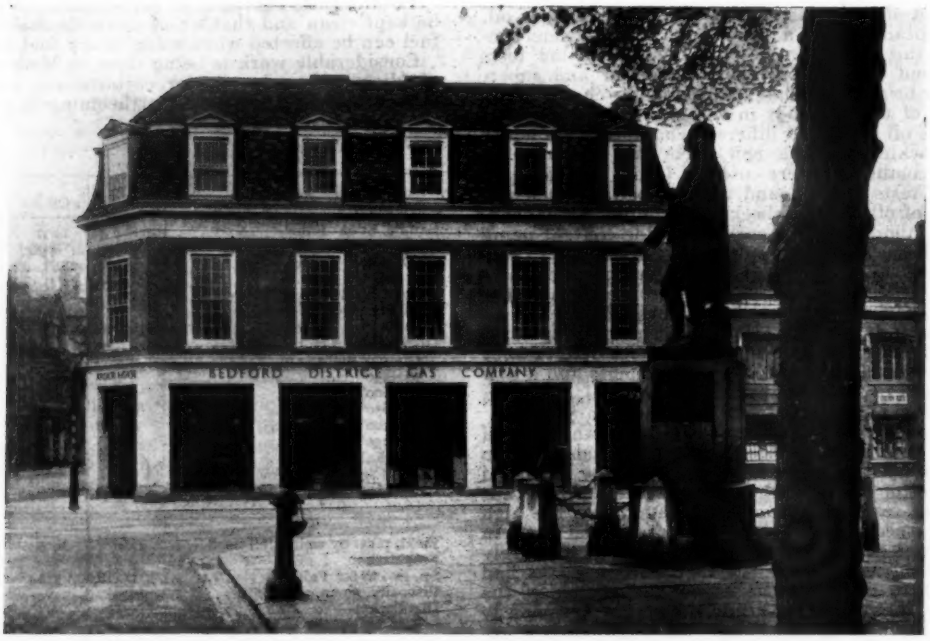
Coke Handling.

Coke is discharged from the coke chambers into a side-opening car and weighed. This car can be taken up to the different levels by means of a platform elevator, to deliver coke to the producer-feed hopper or to a gantry for yard storage. The new equipment installed also includes a vertical water-cooled condenser, Bryan-Donkin exhauster, Holmes-Livesey and rotary washers.

The winter load being only about 75,000 c.ft. per day, and in view of the prevailing demand and cost of coke, the four ovens are kept constantly in operation. The excess coal gas is mixed with a small percentage of producer gas and used for heating the ovens. The remainder of the gas is used for firing the works boiler, which is required in cold weather for supplying steam to heat the various buildings. This gives a very flexible arrangement, allowing at all times sufficient gas for the varying demand.

N. Y. O.

New Gas Showrooms at Bedford



JOHN BUNYAN LOOKS ON PROGRESS . . . ARDOR HOUSE, THE FINE NEW SHOWROOMS OF THE BEDFORD DISTRICT GAS COMPANY.

In last month's issue of the "Gas Salesman" was reproduced a photograph of the interior of the new gas showrooms recently opened by the Bedford District Gas Company.

We publish above a photograph of the exterior of this fine building, by the courtesy of "West's Gas," by whom it is pointed out that standing at the end of the principal shopping street of the town, at the corner of the pretty open space known as St. Peter's Green and facing the statue of the "Immortal Dreamer," these premises occupy one of the best sites for the purpose that it would have been possible to choose for them in the town. This is indeed a symbol of the energetic sales policy which characterizes the leaders of this progressive Gas Undertaking, situated, as it is, in the very heart of the territory where the electricity industry is pursuing one of its most vigorous campaigns.

DAVIDSON ROTARY CARBONIZING SYSTEM

This retort was invented by Mr. T. M. Davidson, of Patent Retorts, Ltd., 5, Victoria Street, S.W., and is being operated by the New Consolidated Gold Fields, Ltd., 49, Moorgate, E.C. 2. The retorting of coal has been carried out under the direction of Mr. John Roberts, D.I.C., Fuel Consultant to the latter Company, who supplied us with the photographs and much of the information in this article

The employment of rotary retorts for the treatment of coal at low temperatures, designed after the fashion of cement kilns, has attracted a number of inventors, mainly on account of the apparent simplicity of design, ease and continuity of operation, and comparatively low cost of erection and operating. Development, however, has been slow, owing to the difficulty of maintaining the internal surface of the retort clear of carbon growths when using normal coking coals, as there is always a tendency for the coke to build up within the retort.

Several methods have been tried for overcoming the above difficulty. In the fusion retort, designed by the late Stainer Hutchins, a loose "star," or cross, breaker was employed; but as this heavy casting turned over in the retort, it was inevitable that a certain amount of breakage of the coke took place. Moreover, the presence of the breaker interfered with the regular formation of lump coke.

In the K.S.G. system two drums are employed, the coal first being subjected to a preliminary heating stage in the inner drum and then passing into the outer drum on the return travel, where it was raised to coking temperature. Chains were employed as scrapers to keep the outer drum clear.

In the Wisner and Heller-Bamag systems, coking coal is first oxidized in a separate drum in order to reduce its plasticity, and the hot coal is then conducted into the carbonizing drum.

Other inventors have employed revolving scrapers or rabbles to prevent the fused coal adhering to the retort.

The Davidson Rotary.

The T. M. Davidson system embraces the use of scraper gear of a novel type, and advantage is also taken of the beneficial effects of blending strongly-coking with weakly-coking or non-coking coals.

The retort was originally designed for the treatment of Estonian oil shale, which is well known to become particularly plastic when heated at low temperatures. To treat this successfully it is essential to keep the shell absolutely clear of growth, while the condition of the residue on discharge is of secondary consideration, so long as the oil-yielding vapours have been evolved. The residue contains only a few per cent. of fixed carbon and of volatile combustible matter; hence it is of little value as a solid fuel, except when used direct while it still retains its sensible heat. In the system as applied to the shale, this plan is followed; the hot residue drops past two valves into an inclined furnace below the retort, where it is burnt. At the rear end of the furnace "stripped" gas is introduced, and the combined fuels generate the whole of the heat required for the distillation process.

The first Davidson unit was erected at Colchester, where it treated several hundreds of tons of Estonian shale quite successfully. This retort is 50 ft. long and 4 ft. in dia-

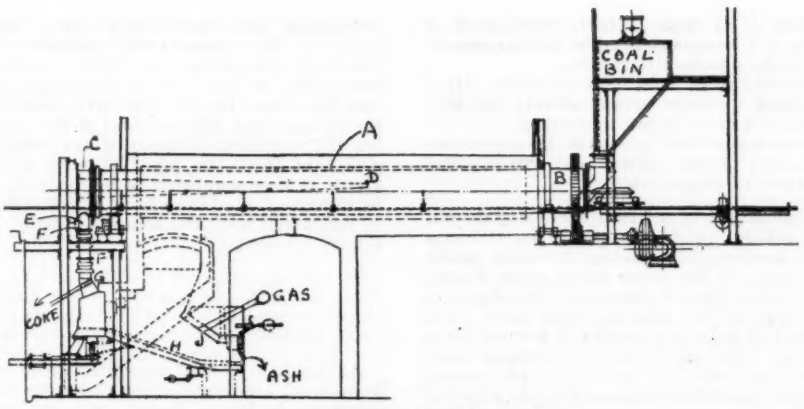


FIG. 1.—DAVIDSON ROTARY RETORT.

meter. As a result of the trials there carried out, the New Consolidated Gold Fields, Ltd., decided to erect six retorts in Estonia. Four of these are 4 ft. diameter, but the length has been increased to 75 ft., incorporating a preheating section, thus economizing heat, as in the original design the flue gases passed to the chimney at about 450° C. The other two retorts are 9 ft. diameter. The plant was put into commission in June, 1931.

Description of Retort.

Referring to the diagrammatic illustration (fig. 1) the Davidson retort consists of a steel shell *A* suitably supported on rollers, and having a slight inclination from the feed end *B* to the discharge end *C*. The retort is provided with a central offtake *D*, on which the scrapers move to and fro longitudinally. A discharge chamber *E* is provided, below which is a duct having mechanically-operated valves *F*, through which the coke is discharged. A screen *G* is arranged to allow the saleable coke to be discharged, while the fines may pass into the furnace *H* to be consumed. Stripped gas enters the furnace at the rear end *J*.

It will readily be understood that the furnace can, if necessary, be dispensed with when treating coal, as the retort can be heated with gas alone or with oil, as required. Any fine breeze produced can be returned to the retort, and the marketable coke discharged at *G* is preferably passed into a cooling chamber for dry cooling. The temperature of the coke as it comes out of the retort is just below 450° C.

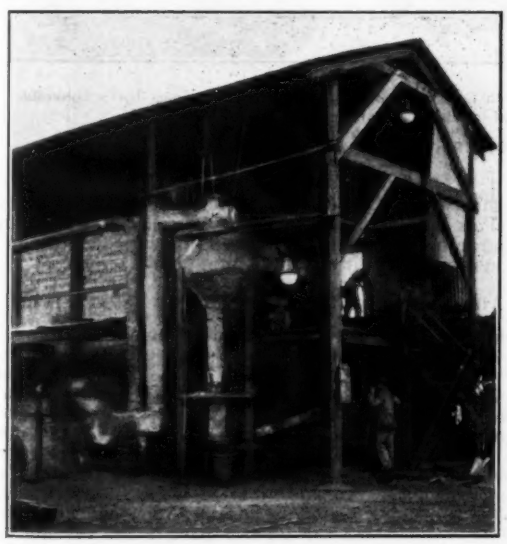


Fig. 2.—Davidson Retort—Discharge End.

Photographs of the Colchester retort are shown in figs. 2 and 3. In the former the gas offtake and dust catcher are shown, while the latter shows the feed end of the retort, with part of the scraper gear and feed control.

Preliminary Tests with Coals.

During the past two years, a considerable amount of experimental work has been done on the Colchester retort in applying it to the treatment of coal. The problem, however, was somewhat different from treating shale, more particularly in that with coal it is essential to obtain a maximum yield of lump solid fuel. Further, while it might be possible to design a plant to work under certain conditions to treat a shale whose fundamental composition and properties did not vary over a wide field, it was realized at the outset that coals vary widely in their behaviour, not only in different coal fields, but in individual fields, and an almost endless variety of propositions thus present themselves.

Taking first the line of least resistance, a cannel coal was selected for treatment. This presented no difficulty whatever. A high percentage recovery of oil was obtained, and the solid residue was well carbonized and smokeless, but high in ash, as the original coal contained 18 p.ct. ash.

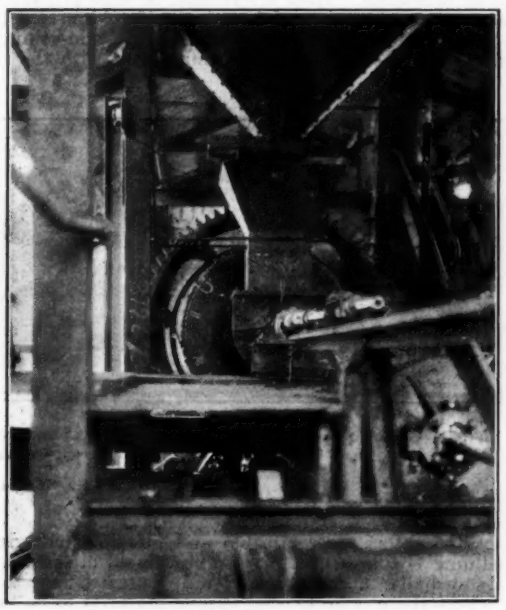


Fig. 3.—Davidson Retort—Feed End.

The next trial was made with a Durham gas coal, having strongly coking properties. It was not expected that this would be so easily treated, and it was found inadvisable to continue its use alone. A subsequent trial was made with a mixture of Durham and cannel coals, and this gave no trouble. Then followed an extensive series of tests with coals of various types, including high-volatile English coking and non-coking coals, high volatile and medium volatile Welsh coking coals, low-volatile Welsh coking coals, and Welsh semi-anthracite coals.

Blending in Rotary and Static Retorts.

It was realized in an early stage that it would be advantageous to blend coking and non-coking coals in the retort, and this plan became general. The subject of blending in *static* retorts has received an enormous amount of attention in recent years, both in the laboratory and on commercial plants, and much valuable information on this aspect has been published. A different approach, however, is called for in the case of *rotary* retort operation, as the conditions are different.

In a static retort the objects of blending are:

(1) Prevention of expansion of the coal. A coal may be sticky, but it may not expand; therefore, such a coal

may work easily in a static retort, whereas if it swells, difficulty will be experienced in discharging it, and a spongy product generally results.

(2) Effecting improvement in heat transmission. Heat penetrates through a charge comparatively quickly, if the plastic layer is not allowed to develop.

(3) The production of a solid fuel of dense, homogeneous texture. An excess of non-coking coal will produce an incoherent mass of fragile coke.

In a rotary retort the object is not to prevent expansion, since the particles of coking coal have room to expand in a partially-filled retort, however thoroughly the coals might be mixed. A sticky coal, on the other hand, even if non-swelling, will adhere to the sides of the drum, therefore, its stickiness must be reduced by mixing with inert fuel. Secondly, as a spheroid of coke in a rotary is formed from the interior outwards, the necessity for passing heat through the coke does not arise; the heat is simply passed through the coal until it completely fuses and binds with the non-coking coal. There is no continuous plastic layer formed, but patches of plastic matter, the sizes of which are controlled by the nature of the ingredients in the blend. Thirdly, an excess of non-coking coal does not necessarily result in a fragile coke. On the contrary, a particularly hard, dense, semi-coke can be obtained when using excess non-coking coal. The coking coal will only pick up the optimum proportion of non-coking coal. "Selectivity," therefore, comes into play in a rotary, but not in a static retort.

Formation of Spheroidal Semi-Coke.

It is characteristic of most rotary retorts that the coke forms in spheroids. They are formed in snowball fashion, a fragment or a number of fragments of coking coal fuse, and immediately come into contact with non-coking or partially-fusible coal, and as this mass rolls with the rotation of the retort, more fusible and infusible material is picked up. Owing to the forward movement of the charge, the "snowball" becomes completed when it passes to the zone where there is no further fusible material to be taken up.

During the process of growth there is practically little increase of temperature of the central section, as the greater part of the heat is expended at all times on the outer surface of the spheroid. This means that the coke is formed at a low temperature, not far removed from that of the intumescing temperature of the coal. Consequently, the volatile content of the solid fuel will be high. This has been found to be the case. Spheroids of various sizes from a given charge were found to contain from 16 p.ct. in the smaller sizes to 20 p.ct. of volatile at 925° C. in the larger sizes. One large ball gave 23 p.ct. of volatile at 950° C.—yet it was absolutely smokeless.

The temperature of the spheroids as they are discharged from the retort has been found from 430° to 445° C. The temperature was determined by drilling a ¼-in. hole into the centre of a ball by means of an electric drill, and then inserting a thermometer, covering the mouth of the hole with cotton wool.

Coals Influence Character of Spheroids.

When blending is employed in rotaries the fuel produced is very compact, and sponginess is entirely absent. The rolling action tends to counteract swelling, as the spheroids come in contact with the retort shell during their formation.

The character of the semi-coke is influenced in a marked degree by the nature of the coals used, especially the non-coking coal. Specimens are illustrated in figs. 4, 5, and 6. The hardest cokes (figs. 5 and 6) were made from blends containing semi-anthracite fines, which were only just fusible at the temperature employed. On viewing the particles of semi-anthracite under a magnifying glass, it is found that at their edges they have become partly fused, and that there has been an inter-penetration effect between the coking coal and the coal of low fusibility, thus increasing the crushing strength of agglomerate. It will be seen also that from the point of view of admixture of ingredients it leaves nothing to be desired. This fuel, as would be expected, is of high bulk density, being 52 lbs. per c.ft., as compared with the following, from "Technical Data on Fuel" (Spiers):

Anthracite	55–60 lbs. per c.ft.
Bituminous coal	50–55 ,, ,,
Steam coal	50–55 ,, ,,
Coke	28–35 ,, ,,

As a domestic fuel it ignites quite readily with a 12-oz. bundle of kindling material, burns brightly with a non-luminous hydrogen flame, and requires attention only at intervals of about 2½ hours. In a coke boiler the grade ¾ to 1½ in. gives every satisfaction.

The fuel made from a blend containing a Warwickshire non-coking coal (fig. 4) is of a different character, in that it requires even less draught than the former. It will burn out completely overnight without attention, even when surrounded with ash, and in this respect it differs from the fuel containing the Welsh coal, which leaves unconsumed cinders overnight in the open domestic grate. In other words, a high-volatile non-coking coal gives a more free-burning semi-coke, particularly when fires are low. The fuel shown in fig. 4 is also lighter, and not so hard or tough as the other. While the one fuel could satisfactorily be marketed in irregular sizes, including the large balls, in the case of the other it might be preferable to break the large balls, and size the fuel at the works.

Fig. 4.—Spheroid of Coke—High-Volatile Coals Used.

Fig. 5.—Coke Spheroids in which Low-Volatile Non-Coking Coal was Used in Blend.

Fig. 6.—Section of Dense Heavy Spheroid.

SPHEROIDAL SEMI-COKE FROM DAVIDSON RETORT.

A third type of product, in which a Welsh semi-bituminous slack was used as the inert material, is intermediate in character, but approaches the English product from the combustibility and toughness standpoints.

Advantages of Low Carbonizing Temperature.

The low temperature of carbonization in the rotary retort calls for further comment, since certain advantages arise therefrom. In the first place, so long as the solid fuel is quite smokeless and firm, it is not essential to increase the input of heat to the retort. It is possible to make smokeless fuel at a lower temperature by this means than in static retorts, and the gases are also evolved at a lower temperature. Secondly, in low-temperature processes it is generally advisable to leave as much gas as possible in the solid fuel, because the main disposable product, from which the greater part of the revenue is to be obtained, is the semi-coke. Surplus gas is not likely to be an asset, except when a ready market is available, as when operating in conjunction with a gas or coke oven undertaking. Therefore, it should be one of the objects of semi-coke manufacturers to aim at the maximum yield of therms in the "solid" state.

The oil market will govern policy as to whether high yield of liquid products should be recovered. Under existing economic conditions there does not appear to be any particular advantage in aiming at yields of 20 gallons of oil per ton, if compensating increased yields of coke can be secured at the expense of (say) 10 gallons of oil. The solid fuel can find a more ready market than the liquid fuel. At the same time, it is as well that a carbonizing system should be adaptable to the production of good yields of liquid fuel, when market conditions justify the

adoption of such policy. High yields of oil have been obtained with suitable coals in this retort.

Yields of Products.

It is obvious that the yields of various products will be governed largely by the nature of raw materials treated. In the tests referred to in this article, yields of oil varying from 9 to 56 gallons per ton have been obtained. A cannel coal gave 56 gallons per ton on retorting; a Durham-Warwickshire blend of coals gave 21 gallons per ton; a Durham semi-anthracite blend yielded only 10 gallons per ton. Where the carbonizing temperature does not exceed 450° C., practically no gas or oil can be expected from the semi-anthracite ingredient. As far as the latter is concerned, the process is simply the equivalent of briquetting fines, but with this difference—no smoky or smokeless binder is used, and the spheroids have better combustible qualities, and are of more general application than ordinary briquettes made from anthracite fines.

Several factors, such as nature of coals, rate of feed, speed of retort, and temperature employed, influence the yield of merchantable semi-coke. The material available for ordinary domestic use is that retained on a ½-in. screen, although the fraction ½ to ¼ in. burns nicely in small coke boilers, combustion being regulated with the greatest ease. As most of these particles are spheroidal, they do not "pack" too closely in a small boiler.

Yields up to 87 p.ct. above ½ in. have been obtained with throughputs ranging from 10 to 15 tons of coal per day. Breeze passing through a ¼ in. screen can be returned to the retort mixed with coal. In the tests here described some of it was, of course, practically unchanged semi-anthracite, when the Welsh non-coking coal was used. Experiments have shown that 10 to 20 p.ct. of such breeze can be used up in this way.

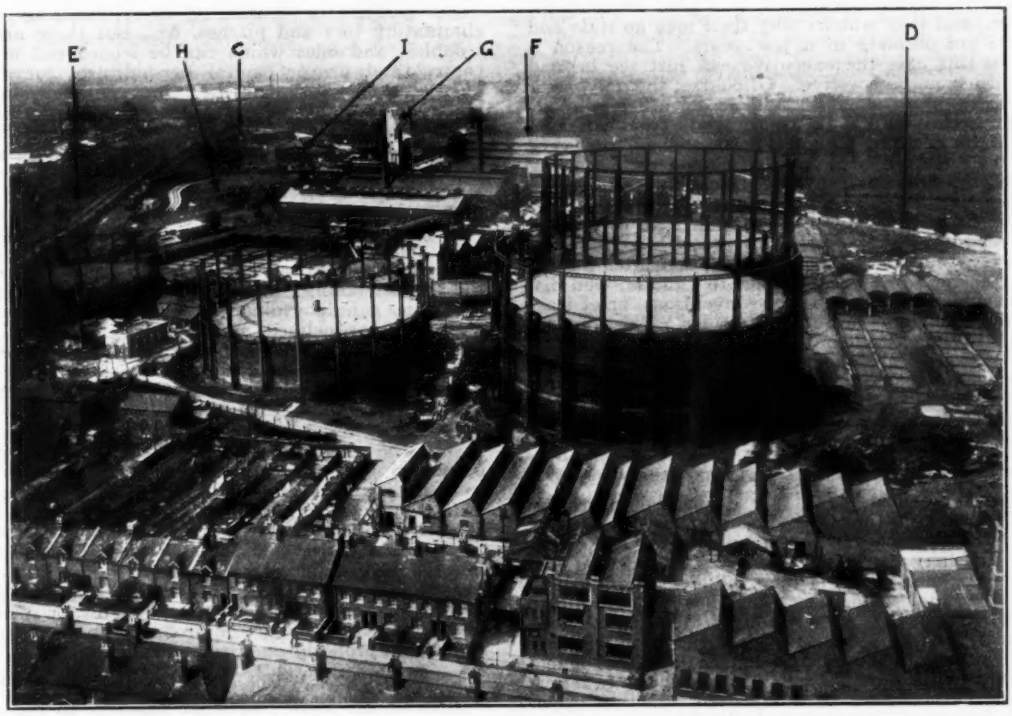
Behaviour of Retort.

It will readily be appreciated that in adapting the shale retort to the treatment of coal certain modifications were called for as the experiments proceeded. With certain coals a number of trials were necessary before the correct conditions for carbonizing were determined. One of the main objects was to ensure that no growth took place on the shell, and that the scrapers fulfilled their proper function. When the scale of semi-coke builds up on the retort, being such a poor heat conductor, the scale resists the penetration of heat to such an extent that the coal passing through may not even coke. It was found possible by proper temperature control, and the use of a special type of scraper, to keep the shell absolutely clean and polished, even when using large proportions of a sticky Durham gas coal.

The nature of the scale and the readiness with which it is removed varies with different types of coal. Blending, *per se*, will rarely ensure a clear retort, but it readily influences the nature of the scale that generally forms. Another source of trouble in rotary retorts is the production of dust. The arrangements for dealing with this have proved effective. The central offtake acts to a certain extent as a dust catcher, and means are provided for allowing the dust to drop into the retort. The dust that passes out with the volatiles is trapped in an external dust catcher. The ash in the coal oil does not exceed 0·125 p.ct. The feeding of coal and the discharge of coke are automatic in this system. When heating by gas only, automatic action can, of course, be secured, and when the special furnace is in use this is automatically operated, as in the system employed at present with shale in Estonia.

A VIEW OF THE - - - SOUTHALL GAS-WORKS

A Photograph taken from the New 8-Million C.Ft. Waterless Gasholder



On p. 484 of last week's issue we published a photograph of what was stated to be the Southall Gas-Works. In reality, this was a photograph of the chemical works only, and we reproduce above a view of the Works taken from the top of the holder. The chief points of the Works are noted as follows: (e) The Great Western Railway, (h) coal stock heap and sidings, (g) coal handling plant, (c) tar storage tanks, (i) tar works, (f) intermittent vertical retort house, (d) Grand Union Canal. As mentioned last week, members of the general public are, upon payment of a small fee, taken to the top of the holder at certain hours of the day, and the proceeds are handed over to the Southall Hospital.

THE "JOURNAL" TECHNICAL RECORD

Which contains Full Reports of Meetings of Gas and Allied Associations

Modern Trends in Gas Engineering Practice

By E. A. MUNYAN, Manager, Gas Department, Union Gas and Electric Co., Cincinnati, Ohio

[Extracts from a Paper read before the Annual Convention of the Canadian Gas Association]

Some of us have considered that we have been, and are, gas engineers, but engineering in the Gas Industry is changing so rapidly that it is just about possible for most of us to keep up with the rapidly changing times in addition to our regular duties. To succeed, however, we must be alert and ready to adopt new practices which have been tried out by others. Sometimes it is necessary for some of us to pioneer and to attempt new practices entirely on our own responsibility, and quite often we are rewarded by greatly improved efficiencies in our plant operation.

The object of all engineering, and particularly gas engineering, is to so operate the manufacturing and distribution plants under our charge that all waste will be eliminated as far as possible, and constantly to improve the efficiencies of operation, thereby not only reducing costs of operation, but also greatly improving production.

Some of us may feel that our plants are operating in first-class condition, that we are operating as cheaply as possible, and that, since we are not spending money, we are saving plenty of it. It has been my experience that just there is a point which determines the well-operated plant and one which is behind the times, and as I go along you will, no doubt, see why this is true.

From past experience I have found that a large number of executives in all kinds of utilities have been very reluctant to allow their minor officials and men in charge of properties to visit other companies, to attend conventions, exhibits, &c., and then wonder why their men go stale and their plants are obsolete in a few years. The reason is obvious. In this case the executive can just see beyond his nose and has no perspective. Of course, the only other way that these minor officials can learn of other methods of operation is through the aid of sales talk from salesmen or through the reading of magazines. These are very good, but not the best ways to learn new ideas, according to many of the best informed and most interested individuals. In our particular Company our officials are only too glad to be progressive, and if any new item or method can show a profit, they allow us to proceed. However, there are a large number of companies in the United States, and I imagine the same thing applies to Canada, who discourage new ideas or attendance at conventions, or at least remain passive and take no forward strides. This particularly applies to the gas side of the utility business, although thousands of dollars are spent on the electrical side, and some of us believe sometimes with little return. Electrical operators have not had to learn the lessons of economy that gas operators have. I say this as one who has operated both gas and electric utilities.

CHANGES IN THE PAST TWENTY YEARS.

Let us just take a glance at the changes of operation that have happened in the Gas Industry in the past twenty years. First, let us consider the manufacturing end of the business. You may remember that twenty years ago coal gas plants were the style, and then the loads improved to such an extent that water gas plants had to be built to take care of the peaks. We all thought at that time that we were near perfection in gas engineering until we were squeezed in rates and the modern efficient and economical engineering practice got its start. In water gas practice, oil results in carburettors were improved, different cycles were tried, larger machines were built, larger generators were put on existing water gas sets, better coals used in coal gas plants, better ammonia yields were demanded, and the manufacturing end of the business was the centre of the Industry.

Just compare the past with the present and future of the Industry. Referring particularly to the United States, with which I am more familiar, we have before us a very different picture. In the past ten years we have been trying to reduce the heat content of the gas, and have done so in a number of cases. We now find that, although 500 to 550 B.Th.U. is the general range of heat unit content, there are a number of situations where the heat units have gone below 500. In other words, we have practically all done away with the old standards, and have so adapted our manufacturing processes that we are able to produce efficiently the lower heat content gases. Such processes have meant the installation of modern mass production bye-product coke ovens, particularly for base load operation and water gas plants for peak load conditions. In recent years, when the price of oil for carburetting has gone up, operators have looked around for cheaper fuels, and oils are now used, which most of us would have considered impossible to use just a short time ago. This applies also particularly to coals. A few years ago we all thought that the only way to generate water gas was with the use of anthracite coal, but some operators used coke as a substitute, and then we all lined up and started using coke, and we found that we got along nearly as well.

We did not get the capacities, of course, but we did get cheaper costs in a number of cases. Now a large number of plants are using soft coal, and have been for about six years, in the United States, and they find that they can produce gas just about as well as formerly, with some slight troubles in cleaning of fires, changing of cycles, eliminating tars and pitches, &c., but these are all local troubles, and ones which can be ironed out with proper control and proper capital expenditures for equipment. The latest development—*i.e.*, that of reforming natural and refinery gases in water gas machines—is of interest. These processes where the newer fuels are available tend either to increase the supply of gas available or reduce the costs.

Isolated plants have in the past two or three years come into prominence. Some smaller cities cannot support the investment of a gas-works of the regular coal gas or water gas type, and a large number of butane air mixing plants have sprung up all over the country. Whether they are the proper thing or not, only time, operations, and economics can determine, but they are at least getting the customers gas-inclined, and will give the normal plant just so many more customers if the regular plants are ever constructed. Costs of operation of this type plant are high, as are also gravities which are always well over 1·0.

DISTRIBUTION.

With the advent of the demand for more gas for not only industrial use but for house heating as well, we have had to change our ideas as to distribution design and operations. Some of us distributed gas in the past, and probably still do, at pressures of from 2 in. to 6 in. Some of us find that, since the increased loads have come on our lines, we are obliged to change our operation, and either to raise pressures in our mains with corresponding increases in leakage, increase the size of our mains, or raise the heat unit content of our gas, or probably do all three in order to operate properly and economically.

HOUSE HEATING EFFECT ON DISTRIBUTION.

Just let me show you what happens to our output in Cincinnati when the house-heating load takes effect. The loads vary considerably from winter to summer, but vary enormously during the hours of the day. In fact, we have to have all facilties at peak operation at all times to take care of the rapid demands on our system. We have 13,000 house-heating installations in our system of 160,000 meters in Cincinnati. We have planned our distribution lines to take care of these enormous demands, and have a

large number of 12 in. low-pressure feeders and a very good belt line system of intermediate pressure mains; but, even so, we have to operate with 12 in. pressure on our low-pressure system with 875 B.Th.U. gas. You can imagine from this what house-heating loads are going to do to your distribution system designs of the future.

A large number of gas engineers state that house heating is not going to be of importance in the future on account of cost, but, just remember, that house heating is a great convenience, and our customers are going to have this convenience regardless of the cost. Houses will be designed in the future, better insulated for the use of gas. There is no reason why anyone should try to heat the great outdoors by leakage of heat from houses. Proper insulation of buildings is the answer.

Future Distribution Design.

From the above, you can see that if the growth of the gas business continues we shall have to change our distribution systems. Larger low-pressure mains will be necessary with larger minimum sizes. More district regulator stations will be necessary, and all distribution facilities will have to be enlarged to take care of not only greater gas consumption, but also much higher and more spasmodic peak hours. This will mean greater investment in plant, but it will come with the advent of more house heating, whether we want it or not. What the design for the individual plant will be, no one can forecast, and this can be determined only by the local conditions involved.

I find a great reluctance among gas men to try new metering equipment. Apparently they would rather have others try it out, and then after from three to ten years they might adopt it, if necessary. This is actually true in the United States. Some of us, in fact, three—Buffalo first, Cincinnati second, and one of the Indiana companies more recently—have been using direct reading or numerical index meters for about three years now, and as far as I know we are the only three companies using this equipment.

Numerical indexes have the advantage of more rapid meter readings, fewer errors, and greatly improved public relations. The average consumer heretofore could not read his meter, and thereby felt that he was being cheated; now it is easy for him. We have 27,000 numerical indexes in our property, and like them very well. We have had very little trouble; in fact, it has been negligible.

Its adoption has been very slow among gas companies. Why, I do not know, as we think it is an excellent piece of equipment. There are many other items in the same category in our Industry, and it is rather peculiar to say the least.

Construction Materials.

This is a very important subject, and one on which no two gas engineers can agree. For pipe lines of long distance apparently nothing but steel pipe has been used to date, but experiments have been carried out with cast-iron pipe. We have successfully tested screw joint cast-iron pipe to 151 lbs., and another type of cast-iron pipe joint to 205 lbs. Some think, however, that steel will continue to be the standard pipe line material for some time. For city low-pressure lines there is quite a difference of opinion. Some engineers favour steel pipe for its usual lower cost and ease of laying, while others favour cast-iron pipe for its longer life and for less necessity of attention and maintenance, although some cast-iron pipe has given considerable trouble at its joints.

In my opinion there are places for both kinds of pipe, depending upon local soil conditions and local economies. Pipe joints have given most of us considerable trouble, and, since our laboratories cannot give us a definite answer, I do not believe any of us are qualified to tell which joint or joints are the right ones to use. There are several excellent mechanical joints on the market, however, and we can all take our choice. We, in Cincinnati, are using considerable plain end cast-iron pipe with cast-iron centre ring couplings and with cadmium plated bolts at the present time, on account of soil conditions; but you will find many in this room who believe that the lead joints, welded joints, and many others of the various types are just as good or better. I, therefore, believe that each engineer should investigate the various types of pipe materials and pipe joints, and use the material best suited to his local condition.

Soil Corrosion.

This is an item costing gas utilities millions of dollars per year for main and service pipe repair and replacement, and one for which no one as yet has a satisfactory solution. I believe we are attempting to solve the problem from the wrong direction, and believe that the solution will be found sooner or later in the use of corrosion-resisting materials instead of trying to protect corrosive materials with pipe coatings that depend for their proper application on the efficiency or inefficiency of the personnel involved. There have been some very sad and expensive mistakes made in the attempts to reduce or stop soil corrosion. We have a rather interesting soil corrosion problem in Cincinnati and are now experimenting with copper tubing with brass fittings for service pipe.

I wonder if those of you in charge of rates take into consideration what soil corrosion is costing you, or will cost you in maintenance in years to come, and if you are going to be able to take care of this maintenance cost through depreciation allowances. If you will check into your situation you may be surprised at what the information obtained will show.

Gas Leakage.

One rather important subject which gas men are interested in as a rule is that of gas leakage. Some have claimed they have had the solution for some time, while still others admit that there is a lot of room for improvement.

We have made four leakage surveys with the aid of an odorizing agent called Ethyl Mercaptan (C_2H_5 SH), vaporizing this liquid and mixing it with the gas as it passes through some point in the line. The first test was in Franklin, Ohio, a city of 1100 meters; the second test was in Middletown, a city of 7500 meters, and the third and fourth tests in Kenton and Campbell Counties, Kentucky, with approximately 36,000 meters total.

We have reduced our leakage very considerably. Time prevents details, but our efforts were not in vain to say the least. We found many leaks and some surprised us.

Distribution Equipment.

Did you ever stop to realize that the only contact the customer has with the utility is through the employees who visit his home, and the only part of the utility equipment he sees is the truck in which this employee gets to the customer's house? When you go home, just look at your trucks, both inside and out, and see whether you want your company to make or lose its reputation in the community on the appearance of your trucks and other equipment. That is actually what happens, whether you intend it to or not. The employees on these trucks should try to keep themselves neat and clean. Uniforms for the employees are quite often of advantage. Here is a wonderful opportunity for a little gas engineering to be used.

The automotive equipment of a company should be kept clean and well painted, and should be designed to entail as few lost motions as possible to the person using the equipment, and should be designed so that costs can be cut through its use. Just for instance, we have an air compressor truck in our property which can be utilized in removing paving, digging ditches, tamping ditches, caulking joints, cutting mains, hoisting material, backfilling ditches with the aid of a scoop and an air winch which are carried on the truck, testing mains, and numerous other operations, a number of which have been suggested by the employees of our company. The truck is dispatched from job to job by the dispatcher, and may be used on many different types of jobs daily.

Personnel.

Personnel, in my opinion, is the heart of an engineering problem in any public utility undertaking. If you have men of the progressive type, whether they be young or old, you will usually have the best operated plant, not only from an engineering standpoint, but as to costs also. Progressive men can design new devices or short cuts in operation. It is surprising how many of us have been operating our plants in the same old rut for a long time, and then later a new man comes in, takes over our job, and makes large savings where we were standing still. The company, of course, has the advantage, and if it is the right kind of a company, the employee will be rewarded. He *should* be at least.

I have found, in my experience, that there are many plants that need someone to enter with new methods of operation and to give the personnel an opportunity to put into effect the plans and hopes that they have had in mind for years, but which those in charge have been holding back.

Plant maintenance and housekeeping are very important in modern gas engineering, as it has been found that clean, well-lighted plants not only entail lower maintenance costs, on account of equipment being repaired when the damage is of a minor nature instead of waiting until it is serious, but also entail fewer accidents to the employees. In addition, well kept plants give you and your company a certain very definite standing in the community as a pro-

gressive undertaking. Numerous gas companies in the world do not enjoy such a reputation, and we all suffer thereby.

The Future.

What does the future hold for gas engineering? In the first place we may expect to see much more house heating than we have ever experienced or hoped for. In Canada, I understand, you try to build your houses tight, and use storm windows to keep out the cold. Insulation of houses will become very important in future construction, and when this is done house heating cannot help but come by leaps and bounds. This means greater peak loads, increased distribution design in main sizes, more holders, and, of course, greater investment. Whether rates will go up or down remains to be seen, but as long as the customer is to get the great convenience of gas heating he will not, I believe, quibble over a little extra cost for the convenience involved. It is up to our Industry to create the desire for this convenience.

I believe that you will all see the time come when natural gas lines will extend all along the Atlantic Coast from Maine to Florida, and nothing will be thought of it. It is not very far off at this time. I believe that you will see much higher pressures in pipe lines and pressures of from 1000 to 2000 lbs. will not, in my opinion, be unusual in the next twenty years. The pressure problem entails nothing except the matter of strength and cost of materials. It can be done easily as far as compression is concerned, and higher pressures mean smaller pipes for the same amounts of gas.

When the cost of gas tends to increase, particularly natural gas, drilling will no doubt be carried out in places where gas was never thought of, and probably new fields will be discovered where we least expect them. The economic cycle will be maintained, the net result being continued use of gas for heating purposes.

The gas engineer and gas engineering are rapidly coming into their own, and the next ten years will bring many very interesting and extensive problems in the Industry. These problems cannot be solved by those outside the Industry who are more or less amateurs, but, since there are millions of dollars involved, the managements of our utilities, whether they be of an operating, financial, or holding company nature, will demand that they be solved by those of us who have had experience and proper training. It is, therefore, our duty as gas engineers to be prepared. Gas engineering is a wonderful field of endeavour, and, although the remuneration has been exceptionally small in most cases in the past, the problems will be so great and the money involved so heavy in the future that well trained and progressive gas engineers will be in demand. The trend of gas engineering is toward better and more economical operations.

Effect of Dehydration and Oil Fogging on Meters*

By J. E. Spindle, Grand Rapids Gas Light Company, Mich.

Undoubtedly one of the most important single factors in the operation of any utility is the condition of the consumer's meter. The correct measurement of the gas passing through the meter means satisfied customers and better public relations. If there should be any doubt on the part of the customer as to its correctness, that suspicion breaks down all the good faith in his relations with you and puts you on the defensive.

The long years of service with the standard gas meter with few design changes is proof of the correct principles of design. The acceptance of these conditions as being fundamentally correct by the regulatory bodies throughout the country is further evidence of the confidence in that design and use. This condition is evidenced by the standard tests as set up in the various Commission Rules of Operation.

From an operating standpoint the correctness of the meter means a check against station operation or gate measurement and, of course, is the dollar register that means the very life of the business. From the distribution man's viewpoint it means just one more unit that must be watched for leaks and the other usual list of troubles. The more it can be left undisturbed the less he has to worry about it.

Getting back to the design of meters, we have a device consisting of a metal body or case with metal valves and rods working through stuffing boxes packed with wool yarn or felt to the registering device, all this being actuated by the movement of flexible leather diaphragms as the gas goes through the various sections in passing through the meters. The metal parts can be selected from numerous kinds of metal available and designed for the particular service so that long life can be expected. No variables need be considered from the metal construction if the proper design and caution are exercised in its construction. The use of the proper packings and greases in the stuffing boxes together with the care used in packing is a study in itself as variables are introduced in this procedure.

"No Two Sheep are Alike."

Then comes the question of diaphragms, and as has been said "as diaphragms are sheepskin, and no two sheep are alike," we have another element of the variables. While this can be admitted to some extent, the selection of the leather, proper tanning, making of the diaphragm, and the proper installation in the meters are operations that have become standardized over years of time, and we can accept present day practice as having discounted practically all questionable issues.

Our meter then is a unit that our experience has proved to be mechanically correct, designed properly for the service to be rendered, and accurate to a remarkable degree. Because of moving parts which mean wear, because of necessary precautions against leakage, and because of leather diaphragms in use, it is necessary to do everything possible to keep the condition of the gas passing through the meter from adversely affecting any of these parts or operations.

From an operating standpoint we know that we must contend with moisture, rust, naphthalene, cyanogen, and gummy deposits, and the effect of each or all of these on the various parts and operations of the meter. An important factor in making the decision on the installation of a dehydration plant at Grand Rapids was the possible saving in meter maintenance—this for the reason that we could stop immediately the water problem with its other elements. Better naphthalene control was another element in the process. Simultaneously with dehydration, oil fogging and gas conditioning were used for main service and meter troubles encountered in the distribution of dry gas.

It will be necessary to describe some of the dehydration process properly to picture the conditioning of the gas sent out. The moisture removal is accomplished to a point just below the dew point of the gas main system. The amount of moisture removed leaves the gas about 85 p.ct. saturated, so that our problem of conditioning, after consideration is given to the absence of moisture, is the replacement of this water-wet condition of the main system and meters with an oil-wet condition. The oil is introduced to coat the piping system for prevention of internal corrosion, to prevent drying-out of joint materials and consequent leakage, to keep rust and naphthalene existing in the mains in a moist condition so that they will not dry and blow along with gas to cause trouble further on, and to lubricate the diaphragm and working parts of the meter.

A partially dry gas will naturally take up any moisture encountered in its travel in such amount as will completely re-saturate it. The second element in the dehydration plant is re-circulation of gas-oil over trays through which the gas is passing. This serves the function of removing any entrained brine that may have carried over, removes the last traces of naphthalene, and allows this partially dry gas a chance to re-saturate with oil.

In addition to this oil scrubber section, the gas going into the distribution system from the holders is treated by the introduction of an oil vapour from a heated vaporizer to complete this oil saturation. This is done before fogging so that the oil fog which is primarily for main lubrication through deposit on the main system will not be lost through absorption into the gas because of its unsaturated condition. The fogging is then accomplished by means of small-capacity foggers utilized at various points in the main system. These two functions can undoubtedly be combined with a fogger of sufficient capacity properly to saturate the gas and furnish additional fog for lubrication purposes.

The oil used in the vaporizer and fogger is furnace oil, the distillate commonly used in oil burners; it is easily obtainable and low in cost. This oil is a little higher fraction than kerosene and has vapour pressure characteristics

* Paper before the American Gas Association Distribution Conference, Cincinnati, 1931.

similar to naphthalene. Its action on naphthalene is a wetting and crimping of the dry flake which prevents its blowing along in the dry flake state. Straw or absorbent oil and gas oil may be used for this purpose.

Clean Meters.

Our meters now come into the shop in an exceptionally clean condition, with but a small amount of the usual oil in the cases. We have no rust except in some of the older meters, which indicates that the previous wet condition had changed and had left as evidence a rusty discoloration. The diaphragms are soft and pliable, with an ample amount of oil to maintain that condition. Some diaphragms have the appearance of being partially dry at one time and have more recently absorbed oil. This would be expected if a meter diaphragm had lost some of the original oil through displacement by water in contact with water saturated gas. With the distribution of partially dry gas this water would be taken up leaving the diaphragm somewhat dry. Then the oil saturation and fogging which followed furnishes the oil wet condition found now.

The best evidence of the results obtained is the record of the seven-year routine change meters passing through our meter repair shop. The record as shown includes the year 1927, previous to the use of dehydration and oil fogging, 1928, during which year we had nine months of water saturated gas distribution and three months with partial dehydration and some oil fogging:

Year.	Meters.	P.Ct. Correct.	P.Ct. Slow.	P.Ct. Fast.
1927	8894	47·54	31·72	15·53
1928	7502	51·22	22·59	19·80
1929	8640	52·14	21·39	21·54
1930	7967	61·37	15·75	19·17

The last year represents a continuous practice of partial dehydration and oil fogging. The results therefore show the gradual improvement in registering accuracy of our meters. Under our seven-year routine change plan all our meters will soon have been set under these favourable conditions. During the past year we decided to find out if the older meters which had been in use under both conditions would reflect a condition somewhat in proportion to the time in service under old and new conditions. We selected two hundred meters which had been in service five years—three years under the old conditions and two years under the new—and found their condition better than the seven-year routine change average condition:

Service.	Meters Tested.	P.Ct. Correct.	P.Ct. Slow.	P.Ct. Fast.	Average Net Error.
5 years	200	65·6	13·5	21·0	0·80 p.ct. fast

To carry this information a little farther we selected two hundred more which had been in service four years, indicating two years under each kind of service and obtained even better results:

Service.	Meters Tested.	P.Ct. Correct.	P.Ct. Slow.	P.Ct. Fast.	Average Net Error.
4 years	200	71·14	3·98	24·87	1·19 p.ct. fast

Then to satisfy our curiosity completely in this matter we took another group of forty-four meters that were set after the dehydration plant and fogging were in use and had been in service two years, and found still further improvement:

Service.	Meters Tested.	P.Ct. Correct.	P.Ct. Slow.	P.Ct. Fast.	Average Net Error.
2 years	44	75·0	25·0	..	2·21 p.ct. slow

These figures substantiate our expectation that conditions would definitely improve with particular respect to the registration of our meters, and we feel sure that as our seven-year routine change period reaches all meters we will then have ideal meter conditions. A fourteen-year diaphragm change was inaugurated several years ago. This procedure improved conditions; but we have now come to the conclusion that this diaphragm life can be extended.

Progress of Pipe Joint Research

By K. R. Knapp, Chief Engineer, American Gas Association Testing Laboratory, Cleveland, Ohio

[A Contribution to the Distribution Conference of the American Gas Association, April, 1931]

During the past year three subjects have received the greater part of our attention. These are the repairing of old bell and spigot joints in service, the testing of new joint combinations in large size, and a study of vibration of mains due to traffic. These points will be discussed in order. In addition, considerable work was also done in testing small joints made up in various ways with cement and cement mixtures. These were covered in the report of the Pipe Joint Committee presented at the 1930 Convention and need not be repeated here.

Repair of Old Joints.

Somewhat over a year ago a questionnaire sent out to the distribution engineers of most of the large cities showed that a large majority considered the use of leak clamps the most advisable method of repairing leaking bell and spigot joints. The results of a number of tests of leak clamps on small joints were reported at last year's Distribution Conference. At that time the opinion was stated that in small sizes the application of leak clamps to joints which had been properly prepared to receive them was considered to be the method of repair most likely to produce satisfactory results. In order to extend the results to pipe of larger size, it was decided by the Pipe Joint Committee to conduct a further investigation on the application of leak clamps to 16-in. joints. Accordingly, a number of tests have been made of the performance of several styles of clamps in this size applied under different conditions. It is our purpose here to outline the method of test which was devised to determine the effectiveness of the repair and to comment briefly on the results.

A test joint was prepared using a bell piece and spigot piece of 16-in. pipe each about 6 ft. in length. The ends were closed with cast-iron caps made with cement joints which were further secured to the pipe by four heavy bolts for additional security against blowing out of place. The joint at the centre was made up with yarn and cast lead caulked by an air hammer, and was carefully faced off preparatory to placing the clamp.

The method of test was based on placing the joint in the testing machine on supports 10 ft. apart and then applying a load to the face of the bell until a given deflection was secured. It was found that the spacing between the screws of the machine was too small to allow placing the joint with a clamp in position directly under the centre of the movable head. To overcome this, the face of the bell was placed slightly to one side of the screws and the joint bridged by means of a heavy steel plate resting on wooden blocks placed on the pipe. Loading was then applied at a point a few inches behind the bell. This, of course, prevented the application of the load exactly in the centre of the specimen, but as all the tests were made under the same conditions, this did not affect the results.

After making some preliminary runs, it was decided to test each joint by first deflecting it 1 in. below the centre

line, then to release the load and rotate the joint through 180°, and finally to deflect it 1 in. on the opposite side of the centre line. This operation was repeated twice, thus giving two full 1-in. deflections in opposite directions. The movement of the joint was measured using a deflectometer.

During the loading, a pressure of 25 lbs. was maintained on the joint. A 10-lb. pressure was first used, but it was found that some clamps were able to withstand a higher pressure than others; so in order to determine the relative effectiveness, the final 25-lb. pressure was adopted. It was planned to reduce the test pressures as leakage took place, but it was found that when a leak once occurred it generally continued even after the pressure was reduced.

Preparing Joints for Clamping.

In preparing the joints for clamping, considerable attention was paid to finishing off the jointing material smoothly and as near as possible flush with the face of the bell. Starting with a cast lead joint prepared in the regular way, it was necessary to re-caulk it before applying a clamp a second time. After this had been done a few times, re-facing of the joint was necessary as re-caulking recessed the lead too far. This was done by cutting out the lead to a depth of about ¾ in. and re-facing with lead wool brought out flush with the bell face. After a few further clampings, with re-caulking between each, it was necessary again to face up the joint.

Several tests were made in which the gasket was applied directly to the face of the joint without the use of any gasket compound. Generally speaking, the results were not as satisfactory as when a coating of compound was applied. This material seemed to lubricate the surface of the pipe and prepare the joint in better fashion for the reception of the gasket. A number of tests were made in which it was found possible to maintain the joint tight throughout during the series of four successive deflections of 1 in. each. The use of a plain rubber gasket gave better results than were obtained when a duck-faced gasket was used. The plain rubber gasket was of somewhat softer material which seemed to conform better to any irregularities in the face of the joint.

Several types of leak clamps were tested under the conditions outlined above. A considerable difference in performance was noted for individual types of clamps. So far this work has not been finished, and it is therefore not possible to make any final recommendations on the type of clamp which should be used to secure the best results. It is felt, however, that some principles have been discovered which should be followed to secure the most satisfactory results. It is important that the face of the bell and the surface of the pipe close to it should be thoroughly cleaned. The joint should also be carefully faced to receive the clamp. By this is meant the bringing out of the joint material flush with the bell face even though this may require cutting out a portion of the old material and re-facing it. It was found advisable to use a gasket compound of a consistency which can readily be applied with a brush to the face of the bell and the adjacent pipe before placing of the gasket, as this served as a lubricant and tended to improve the performance of the clamp. In a number of instances it was necessary to shorten the gasket slightly to accommodate the diameter of the pipe. If an attempt is made to clamp a gasket which is too long, naturally the gasket material cannot come in proper contact with the joint around its entire circumference with the result that leaks readily develop. The best results were obtained when the gasket was of such a length that a slight stretching was necessary to make its ends meet when placed over the pipe. The gasket may be held in place before the clamp is drawn up by means of a heavy staple. It was also important to make use of a gasket wide enough to permit a substantial overlap over the material of the joint. Narrow gaskets were found generally unsatisfactory. Plain rubber gaskets appeared to give somewhat better results throughout than were secured from those in which a fabric facing was used in direct contact with the joint.

In connection with the work with leak clamps, the Pipe Joint Committee decided that a thorough investigation should be made of different types of rubber repair rings for insertion within the bell, which now are on the market or in process of development. Accordingly, considerable work has been done in an attempt to obtain data on the performance of such rings. Some new styles recently developed have also been tested with this thought. So far, however, the results from these rings when applied to repair work have not been entirely satisfactory, and it is felt that our statements of a year ago in regard to the use of such rubber rings in the repairing of bell and spigot joints have not been materially changed by our recent experiments. One of the main objections to such rings for repair work is the difficulty of applying them properly to a joint which is not of uniform width. It is possible to secure very satisfactory results from certain types of rubber rings when used on new work, but thus far it has not been possible to use them on repair work and obtain tightness under the conditions of test which have been applied. It is our purpose to continue this investigation for some time in the future with the hope that some modifications of existing designs or new designs can be developed which will prove able satisfactorily to meet the test conditions to which they are subjected. While progress has been made on this subject, we are not yet in a position to recommend the wholesale application of rubber rings to existing joints for the purpose of effecting a repair which can be considered wholly satisfactory.

In regard to other methods of joint repair involving cutting out the old material and re-making of the joint, nothing further has been discovered which would cause us to recommend such methods. Such repair methods naturally are not likely to give results which are equal to what might be expected of new joints prepared in the same manner—that is, by the use of yarn with cement, cast lead, and lead wool. It is slightly more difficult to secure the proper re-making of a joint under such conditions as are likely to be encountered in practice and where it is impossible to shift the pipe so as to obtain a uniform joint space or to obtain a thoroughly clean metal surface. For these reasons it appears doubtful whether such methods of repair are to be generally recommended.

New Joints.

During the past summer considerable work was done on the subject of the testing of various new joint combinations in the 16-in. size. This was all conducted at the Civil Engineering Laboratory of the University of Pennsylvania in Philadelphia. It was necessary to obtain unusually heavy testing equipment to carry on this work, and for this reason the location mentioned was chosen. The testing was done on a 600,000-lb. Olsen testing machine. While the maximum capacity was not necessary for the load required, it was not found possible to obtain a smaller machine with sufficient horizontal clearance to allow proper mounting of the specimens.

It was necessary to have special castings made up for use in preparing the sample joints. Flange and bell and flange and spigot pieces were used. The outer flanged ends were closed by heavy solid discs bolted to the flanges to permit the securing of a pressure chamber within the specimen. The necessary castings were prepared and machined by one of the pipe foundries.

Due to the weight of the specimens, it was not necessary to take any particular precautions to hold the pipe in position with respect to the bell while making up the joint. The shoulder at the base of the bell, the bell face, and the end of the spigot were machined so as to form parallel surfaces, thus making sure that the spigot when dropped in place was directly axial with the bell piece.

A number of types of joints in common use were prepared and tested. Preparation of these joints was carefully supervised and the actual work done by a workman from the Philadelphia Gas-Works Company who had had long experience in the making of such joints. The types of joints tested were as follows:

1. Cement and cement mixtures.
2. Cast lead.
3. Lead wool.
4. Combination cement and lead.
5. Rubber ring and lead wool.

The specimens were furnished in three styles of bell, No. 1 A.G.A. Standard, No. 2 A.G.A. Standard, and a special straight sided bell 6 in. in depth with no lead groove. The No. 1 bell was used for all lead, lead wool, and rubber ring joints. The No. 2 bell was used exclusively for cement joints, as it was felt that better results could be expected with this design of bell than could logically be expected with the No. 1 bell on account of its greater depth. The special bell was used for combination joints made up with cement at the bottom and finished with lead at the face.

Considerable difficulty was experienced during the earlier part of this work which had been conducted at intervals through a part of the winter. It was not possible at that time to secure continuous operation of the testing equipment, and the results were distinctly unsatisfactory. It was felt from the start that some unexplained irregularity was present which did not permit the proper application of loads to the joints. When continuous work was started, the trouble was located and adjustments made to compensate for it. It was then possible to obtain consistent results throughout.

(*To be continued.*)

REGISTER OF PATENTS

Coke Ovens.—No. 353,473.

THE KOPPERS COMPANY, of Pittsburgh (Assignees of BECKER, J., of Pittsburgh).

No. 12,689; April 24, 1930. Convention date, Jan. 28, 1930.

This invention relates to methods of and apparatus for controlling the supply of gaseous media to coke-oven batteries. An object of the invention is to provide a method of supplying gaseous media to coke-oven batteries whereby, when the rate of combustion therein is relatively low, the distribution of heat therein may be substantially uniform over a given period. A further object is to provide a method for supplying combustible media to coke-oven batteries in varying amounts whereby the total is that necessary for the coking operation and whereby a more nearly uniform distribution is effected than if the supply were constant. A further object of the invention is to provide apparatus for periodically varying the supply of combustible media to coking retort ovens within predetermined limits wherely the total media supplied over a given period is that necessary for performing the coking operation. A still futher object is to provide apparatus for periodically and simultaneously varying the quantities of fuel gas and air that are supplied for combustion in the heating walls of coke-oven batteries.

In the operation of coking retort ovens employing either coke-oven gas or lean gas, such as producer gas, for underfiring the ovens, little or no difficulty is encountered in the distribution of the heat of combustion when the ovens are operated upon a relatively short coking time, such, for example, as 15 or 16 hours for the production of blast furnace coke. However, in some cases, it may be desirable to prolong the coking time for a period of, for example, from 24 to 30 hours for producing foundry coke. When the longer coking time is used, it is obvious that the amount of fuel to be supplied to the heating walls of the battery is considerably reduced, because the rate of coking varies inversely with the increase in coking time. When the amount of fuel gas is reduced in accordance with the requirements, the flames in the heating flues are shortened. It has been found that the vertical distribution of heat in the heating walls is not uniform under these conditions, and that a portion of the charge is coked prior to other portions of the charge. This unequal distribution of heat affects the quality of the coke and is accordingly an undesirable condition.

In order that the distribution of heat vertically may be more nearly uniform while the total effect is the same in that a long coking time is obtained, an arrangement is provided in which the supply of gas and air to the heating walls of coke-oven batteries is periodically varied. During one portion of the heating cycle, the supply of both gas and air is below the average amount required. During the succeeding portion of the cycle, the supply of gas and air is sufficiently above the average amount required that the heating effect is the same as if the supply were constant and of the average amount. The result is, state the patentees, that the vertical distribution of heat, while not uniform in either of the periods referred to above, is substantially uniform in any given cycle. This method of operation, accordingly, produces uniform coking of the charge as a whole, and the quality of the coke is correspondingly improved.

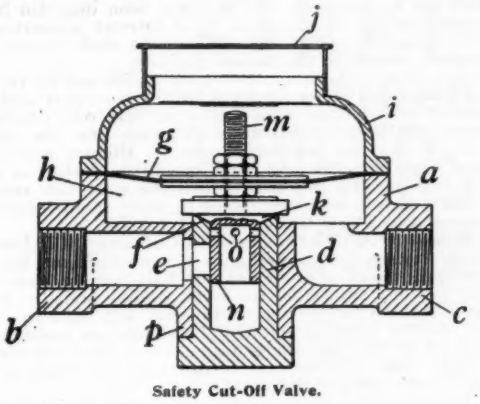
Safety Cut-Off Valves.—No. 353,681.

RADIATION, LTD., of Birmingham, and YATES, H. J., of 15, Grosvenor Place, S.W. 1.

No. 21,647; July 17, 1930.

This invention relates to automatic gas valves of the kind whereby, in the event of interruption of the gas supply to lighting, heating, cooking, and other apparatus, the valve will automatically close and prevent further flow, when the supply is re-established, until the valve is purposely re-opened. The invention comprises the combination of a poppet valve, a cylindrical extension on one side of the poppet valve, a fixed cylindrical member with which the poppet valve and its extension co-operate, and gas passages or ports in the fixed and movable cylindrical parts, as hereinafter described. The accompanying diagram is a sectional elevation of an automatic gas valve constructed in accordance with the invention. A body part *a* is provided with suitable inlet and outlet connections *b*, *c*, respectively. These are separated by a hollow fixed cylindrical member *d* forming the stationary member of the valve. Gas can flow into the member *d* through a side opening *e*. The member *d* is preferably formed separately from the body part and is inserted and secured in a hollow central boss *p* in the body part. At the upper end of the member *d* an annular seating *f* is provided, and the region above this member is closed by a flexible diaphragm *g* forming one side of a chamber *h* through which gas can flow to the outlet *c*. The diaphragm is clamped between the body part *a* and a cover *i* provided with a removable lid *j*. Attached to the diaphragm is a poppet valve *k*, which may, if necessary, be loaded in any convenient manner, as by the addition of a metal disc to the stem *m* of the valve. At the underside of the poppet valve a hollow cylindrical extension *n* is provided, this being arranged to slide freely within the fixed member *d*. Holes *o* are formed in the extension *n* adjacent to the underside of the poppet to allow gas to flow through the interior of the extension to the diaphragm chamber *h* and outlet *c* when the valve is open.

When the valve is closed the poppet rests upon its seating *f*, and the extension *n* closes the side opening or port *e* in the stationary cylindrical member *d*. Also the holes *o* in the extension beneath the poppet are closed as they now lie within the stationary member. It is impossible for the valve to be re-opened by the pressure of the gas, as the latter presses laterally on the extension and is unable to exert a pressure in the axial direction. To re-open the valve, it is necessary to lift the valve by hand. This may be done by removing the lid *j* and applying the hand to the projecting part of the valve stem *m* above the diaphragm, or by a lever (not shown) adapted to impart only a lifting movement to the valve.



Safety Cut-Off Valve.

While gas is flowing through the valve it is held open by the pressure of the gas on the diaphragm. In the event of interruption of the gas supply, the valve immediately drops and closes the passage until re-opened by an intentional movement. Automatic valves of this kind are applicable to a variety of uses, but are especially adapted for domestic systems in which the gas is supplied through prepayment meters.

Supports for Water Heaters.—No. 353,814.

JUNKERS, H., of Dessau/Anhalt.

No. 37,772; Dec. 15, 1930. Convention date, April 17, 1930.

The object of this invention is to design the supporting device in such a manner as to facilitate and cheapen its manufacture and also to permit it to be easily taken to pieces to facilitate packing and despatch. The supporting device is in the form of a framework built up from separate parts such as metal plates, section bars, tubes, and the like, and is adapted to fit against the wall and to carry the main parts of the heater —namely the heater exchanger, the fittings and the supply pipes—while its upper part carries the waste gas pipe. That portion of the frame which fits against the wall is preferably constructed of separate parts, some horizontally and others vertically disposed, and which are either assembled to form a framework, or mounted crosswise over one another. These several parts are preferably connected together in a detachable manner, so that the frame can be easily taken apart and re-assembled. That portion of the frame which projects forward and carries the waste gas pipe may be integral with the frame members fitting against the wall, or may be subsequently attached thereto. An outer shell enclosing the heater members mounted on the frame may also be detachably connected with the latter, so that, on the shell being removed, the various parts of the heater are readily accessible.

Legal Intelligence

Claim for Gas Account.

At the Worcester County Court last week, before His Honour Deputy Judge Pritchett, the Corporation of Droitwich, represented by Mr. A. V. Holyoake, claimed £17 9s. 8d. for gas against John Henry Young, a restaurant proprietor, who was represented by Mr. J. R. Anthony. Mr. Holyoake explained that if a bill were paid on or before May 20 a certain discount was allowed, but after that day the total amount was required. This fact was given at the foot of the bill. On May 20 Young did send a cheque for £14 6s. 7d., but it was not in order because it was not for the full amount required. Mr. Anthony, for defendant, contended that the Corporation must first show that Young agreed with the note on the bill. His Honour, however, ordered the payment of the whole debt.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

The home political situation was the dominating influence affecting business on the Stock Exchange last week, and markets were dull and uninteresting. A temporary improvement took place in the gilt-edged section on the formation of the National Government; but this was soon dispelled by the persistent rumours of a tax on fixed interest securities, and until the proposals of the new Cabinet are made known there can be little change in the present position.

The Gas Market, however, continued unaffected by the political situation, and prices remained for the most part unaltered. A number of dealings took place in Imperial Continental ordinary, but the price fell away 10 points over the week to 310. On Friday last several parcels of Alliance and Dublin ordinary came on offer and were speedily absorbed at prices varying between 105 and 106, though the quotation remained unaltered. Among ordinary issues to show improvement was Tottenham, which registered a rise of 1 point.

The Report of the Metropolitan Gas Company (of Melbourne), previously indicated by a preliminary announcement, has been received and shows a profit for the half-year to June 30 of £126,757 (against £94,328 for the corresponding period). £20,000 has been transferred to reserve (against *nil*), and to capital account £14,702 (against £8452). The Directors recommend a dividend of 6s. 6d. per share (same), and after allowing for these items the carry-forward is increased by £7555 (£1376), making a total forward of £51,016.

The European Gas Company has announced an interim dividend of 2 p.ct. tax free, the same rate as a year ago.

Current Sales of Gas Products.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Aug.* 31.

The prices for tar products, in fair quantities, are unchanged, and remain as follows:

Pitch is firm at 52s. 6d. per ton f.o.b.

Creosote, for export, varies from 3¾d. to 5d. per gallon f.o.b., according to specification.

Pure toluole is 1s. 10d. to 1s. 11d. per gallon; pure benzole, about 1s. 4d. per gallon; 95/160 solvent naphtha, about 1s. 4d. per gallon; and pyridine bases, 3s. to 3s. 3d. per gallon.

Prices for spirits are *ex* sellers' works.

Tar Products in the Provinces.

Sept. 1.

The average prices of gas-works products during the week were: Gas-works tar, 20s. 6d. to 24s. 6d. Pitch—East Coast, 52s. 6d. to 53s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 52s. 6d. to 53s. 6d. f.o.b.* Toluole, naked, North, 1s. 6½d. to 1s. 6¾d. Coal-tar crude naphtha, in bulk, North, 5d. to 5½d. Solvent naphtha, naked, North, 1s. 1½d. to 1s. 2d. Heavy naphtha, North, 10½d. to 11d. Creosote, in bulk, North, liquid and salty, 3½d. to 3¾d.; low gravity, 1¼d.; Scotland, 3¼d. to 3½d. Heavy oils, in bulk, North, 5d. to 5½d. Carbolic acid, 60's, 1s. 3d. to 1s. 4d. Naphthalene, £9 to £10. Salts, 50s. to 70s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port, it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Aug.* 29.

Quotations are somewhat irregular according to the individual position of each distiller. Creosote oil and refined tar are steady, while solvent naphthas remain weak.

Pitch.—Value is nominal at about 40s. to 42s. 6d. per ton f.o.b. Glasgow for export with forward indications some shillings higher. Home value is about 40s. per ton *ex* works.

Refined tar to Ministry of Transport Specification is in good demand for prompt delivery at 2½d. to 2¾d. per gallon f.o.r. makers' works.

Creosote oil.—Supplies are not too plentiful. B.E.S.A. Specification is 2¾d. to 3d. per gallon; low gravity, 3¼d. to 3½d. per gallon; and neutral oil, 3¼d. to 3½d. per gallon—all f.o.r. in bulk.

Cresylic.—There are many inquiries but few orders. Pale 97/99 p.ct. is 1s. 3d. to 1s. 4d. per gallon; dark 97/99 p.ct., 1s. 2d. to 1s. 3d. per gallon; and pale 99/100 p.ct., 1s. 5d. to 1s. 6d. per gallon—all f.o.r. works.

Crude naphtha.—Quotations range from 4¼d. to 4¾d. per gallon according to quality.

Solvent naphtha.—Market is dull with quotations easy. 90/160 is 1s. 2d. to 1s. 3d. per gallon, and 90/190, 11d. to 1s. per gallon.

Motor benzole.—Quoted at 1s. 2d. to 1s. 3d. per gallon f.o.r. in bulk.

Pyridines are in better call, but values are unchanged. 90/160 grade is 2s. 9d. to 3s. per gallon, and 90/140 grade 3s. to 3s. 3d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole:

	s.	d.		s.	d.	
Crude benzole	0	5½	to	0	6¼	per gallon at works
Motor ,,	1	0	,,	1	1	,, ,, ,,
Pure ,,	1	4	,,	1	5	,, ,, ,,

Overseas Opportunities.

[From the Board of Trade Journal.]

China.

Galvanized Gas and Water Tubes and Fittings.—A British firm at Shanghai desires to obtain the agency of a British manufacturer of the above. (Ref. No. 193.)

Trade Notes.

Coventry and Renold Products.

We have received from the Coventry Chain Co., Ltd., and Hans Renold, Ltd., a copy of their 1931-32 combined catalogue of products for industrial applications. They draw attention to the "Foreword" wherein is a statement of the Associated Companies' policy concerning the marketing of Brampton, Coventry, and Renold products. They state that Brampton mark transmission chains have now been withdrawn, but alternatives will be available under either the Coventry or Renold mark. There is now a very comprehensive range of chains, chain drives, and accessories available to cover all industrial requirements, while a feature of particular interest is the introduction of the Renold push-pull remote control gear.

Contracts Advertised To-Day.

Concentrated Liquor.

The Burnley Gas Department invite tenders for the purchase of crude concentrated liquor. [Advert. on p. 550.]

Gasholder.

The Dunbar Gas Commissioners invite tenders for the supply, delivery, and erection of a gasholder. [Advert. on p. 550.]

Municipal Gas Undertakings' Results in 1930-31.

TEIGNMOUTH.

The gross profit of the Teignmouth Gas Department for the year was £4851. Income-tax absorbed £1084, interest on capital £2114, and repayment of capital £1913. These items total £5111, making it necessary to take £260 from the credit balance of the Department, which is therefore reduced to £3141. The gross income of the Department was £26,909, and the expenditure £27,169. Included in these amounts is the rebate given to the gas consumers of £1362. The total amount of gas sold was 89,650,700 c.ft., or 403,428 therms, which is 5 p.ct. increase over last year. There has again been an increased sale per consumer of 2 p.ct. in the case of ordinary consumers and 7 p.ct. for slot consumers. The number of consumers increased by 22, and now numbers 2556. Sales of residuals were maintained, but the prices realized for coke and tar were less. A coke-breaking plant was installed during the year and helped considerably to keep up the sale of coke. The public lighting was improved in June, 1930, by the replacement of the 500 candle-power lamps on the promenade by 1000 candle-power lamps, and by 500 candle-power lamps along the East Cliff Promenade in place of 200 candle power. Several more lamps were erected, the total now being 386. The coal carbonized was 5362 tons, and the coal gas made was 76,853,000 c.ft., which was supplemented by 16,725,000 c.ft. of carburetted water gas made from 507 tons of coke with 20,865 gallons of gas oil. The coke made for sale was 1537 tons.

STOCK AND SHARE LIST.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Aug. 28.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
£			% p.a.	% p.a.				
171,978	Stk.	Feb. 5	3	3	Aldershot 5 p.c. max. C. ...	78—83	...	...
522,992	,,	,,	4	4	Do. 4 p.c. Pref. ...	75—80	...	...
1,551,868	,,	Apl. 9	7⅞	7⅞	Alliance & Dublin Ord. ...	102—107	...	105—106
374,000	,,	July 9	4	4	Do. 4 p.c. Deb. ...	71—76	...	...
522,655	,,	Aug. 24	7	7	Barnet Ord. 7 p.c.	121—126*	−3	...
300,000	1	Apl. 23	1/4⅛	1/9⅜	Bombay, Ltd.	16/6—18/6	...	...
174,500	10	Aug. 10	9	9	Bournemouth 5 p.c. ...	14⅝—15⅝	...	...
500,050	10	,,	7	7	Do. B 7 p.c. ...	12½—13	...	...
439,160	10	,,	6	6	Do. Pref. 6 p.c. ...	11—11½	...	...
50,000	Stk.	June 25	3	3	Do. 3 p.c. Deb. ...	60—63	...	...
162,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	80—83	...	...
357,900	,,	Aug. 24	7½	7½	Brighton & Hove 6 p.c. Con.	109—114*	−3	112½—113½
371,880	,,	,,	6⅔	6⅔	Do. 5 p.c. Con.	102—105*	−3	...
1,287,500	,,	July 23	5	5	Bristol 5 p.c. max.	97—98[a]	+1	...
120,420	,,	June 25	4	4	Do. 1st 4 p.c. Deb. ...	78—80[a]	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	78—80[a]	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	98—99[a]	...	...
855,000	,,	Apl. 9	7	8	British Ord.	110—115	...	...
100,000	,,	June 25	7	7	Do. 7 p.c. Pref.	110—115	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	77—80	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	97—100	...	...
160,000	,,	June 25	5	5	Cambridge 5 p.c. Deb. ...	98—101	...	...
100,000	10	May 21	6	8	Cape Town, Ltd.	9—10	...	...
100,000	10	May 7	4½	4½	Do. 4½ p.c. Pref. ...	6½—7½	...	...
150,000	Stk.	June 25	4½	4½	Do. 4½ p.c. Deb. ...	72—77	...	...
626,860	,,	July 23	6	6	Cardiff Con. Ord.	95—98	...	...
237,860	,,	June 25	—	2⅜	Do. 5 p.c. Red. Deb.	99—102	...	...
157,150	,,	Aug. 10	6½	5	Chester 5 p.c. Ord.	85—90[b]	...	...
98,936	1	May 7	†2/-	†2/-	Colombo, Ltd. Ord.... ...	28/—33/-	...	...
24,500	1	,,	1/4⅛	1/4⅛	Do. 7 p.c. Pref.	17/6—19/6	...	...
609,204	1	Apl. 9	1/4⅛	15'27[d]	Colonial Gas Assn. Ltd. Ord.	16/—18/-	...	...
296,053	1	,,	1/7⅛	17'67[d]	Do. 8 p.c. Pref.	17/6—19/6	...	...
2,073,280	Stk.	July 23	6	6	Commercial Ord.	92—95	...	93½—94½
475,000	,,	June 11	3	3	Do. 3 p.c. Deb. ...	59—62	...	...
787,560	,,	Aug. 10	7	7	Croydon sliding scale ...	107—110	...	108½—109½
458,100	,,	,,	5	5	Do. max. div.	81—84	...	82½—83½
542,270	,,	Aug. 24	10	7	Derby Con.	120—125[c]*	−1	...
55,000	,,	June 25	4	4	Do. Deb.	65—70[c]	...	...
209,000	,,	Mar. 5	5	5	East Hull Ord. 5 p.c. ...	72—75	...	...
1,002,180	,,	Mar. 19	†4	†6½	European, Ltd.	90—100	...	87½—94
18,953,033	,,	July 23	5⅔	5⅔	Gas Light & Coke 4 p.c. Ord.	18/9—19/9[f]	...	19/3—19/7½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max. ...	65—68	...	66½
4,294,691	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	78—81	...	79½—80½
5,694,095	,,	June 11	3	3	Do. 3 p.c. Con. Deb. ...	60—63	...	61½—62
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	101—104	...	101—102½
2,500,000	,,	,,	—	—	Do. 4½ p.c. Red. Deb. ...	95—98	−1	96—97
161,480	,,	Mar. 5	10	10	Harrogate Cons. 10 p.c. max.	157—162	...	...
82,500	,,	Aug. 24	7	7	Hastings & St. L. 5 p.c. Conv.	95—100*	−3	...
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	80—83*	−2	...
70,000	10	Oct. 9	§	10	Hongkong & China, Ltd. ...	13—14	...	...
213,200	Stk.	Aug. 10	6	6	Hornsey Con. 3½ p.c. ...	89—92	...	...
2,800,000	,,	May 21	15	25	Imperial Continental Cap.	300—320	−10	303—315
223,180	,,	Aug. 10	3½	3½	Do. 3½ p.c. Red. Deb.	76—81	...	...
235,242	,,	Aug. 10	8½	8½	Lea Bridge 5 p.c. Ord. ...	124—127	...	...
2,145,907	,,	Aug. 24	6	6	Liverpool 5 p.c. Ord. ...	95½—96½[b]*	−3⅜	95½
306,083	,,	July 15	4	4	Do. 4 p.c. Deb. ...	79—81[b]	...	...
165,736	,,	Aug. 24	9	9	Maidstone 5 p.c. Cap. ...	127—132*	−3	...
63,480	,,	June 25	3	3	Do. 3 p.c. Deb. ...	57—60	...	...
75,000	5	June 11	†10	†10	Malta & Mediterranean ...	6½—7½	...	...
392,000	—	Apl. 2	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	80—85	...	...
675,000	Stk.	May 21	†6	†6	Montevideo, Ltd.	80—90	...	...
2,061,315	,,	Aug. 10	5⅔	5	Newcastle & Gateshead Con.	16/—16/9[d]/	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	74—75[d]	...	74½
691,705	,,	Jan. 8	3½	3½	Do. 3½ p.c. Deb. ...	69—71[d]	...	...
277,285	,,	May 7	5	5	Do. 5 p.c. Red. Deb.	98—100[d]	...	...
199,940	,,	Aug. 24	7½	7½	North Middlesex 6 p.c. Con.	112—117*	−3	...
396,160	,,	Aug. 10	5	5	Northampton 5 p.c. max. ...	74—79*	...	...
300,000	,,	Apl. 23	9	7	Oriental, Ltd.	93—103	...	...
69,000	5	13 May, '15	—	—	Ottoman	0—⅛	...	...
205,162	Stk.	June 25	8	8	Plym'th & Stonehouse 5 p.c.	110—115	...	...
424,416	,,	Aug. 24	8	8	Portsm'th Con.Stk. 4 p.c.Std.	119—124*	−3	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	76—79*	−2	...
686,312	,,	July 23	4	4	Primitiva 4 p.c. Rd. Db. 1911	83—86	...	...
389,813	,,	June 25	4	4	Do. 4 p.c. Cons. Deb.	84—87	...	...
150,000	10	Apl. 9	6	6	San Paulo 6 p.c. Pref. ...	8—8½	...	8⅞
1,736,968	Stk.	Mar. 19	6½	6½	Sheffield Cons.	105—107[e]	...	...
95,000	,,	July 9	4	4	Do. 4 p.c. Deb.	79—81[e]	...	...
90,000	10	June 11	‡5	‡5	South African	3½—5½	...	...
6,709,895	Stk.	July 23	7½	5	South Met. Ord.	101½—103½	...	102½—103½
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	112—115	...	...
1,895,445	,,	July 9	3	3	Do. 3 p.c. Deb. ...	60—63	...	61½—62
734,000	,,	Mar. 5	6½	6½	Do. 6½ p.c. Red. Db.	98—100	...	...
1,000,000	,,	July 23	4	5	Do. 5 p.c. Red. Deb.	100—103	...	101¼—101¾
91,500	,,	Aug. 10	8½	8½	South Shields Con.	110—112[d]	...	...
1,548,795	,,	Aug. 10	6⅔	6⅔	South Suburban Ord. 5 p.c.	101—104	...	102½
668,837	,,	June 25	5	5	Do. 5 p.c. Deb.	100—103	...	100
647,740	,,	Aug. 24	5	5	Southampt'n Ord. 5 p.c. max.	76—79*	−2	...
121,275	,,	June 25	4	4	Do. 4 p.c. Deb.	77—80*	...	...
179,014	,,	Aug. 10	8	8	Sutton Ord.	140—150*	...	...
94,500	,,	June 25	5	5	Do. 5 p.c. Deb.	96—99	...	...
250,000	,,	Aug. 24	7	7	Swansea 7 p.c. Red. Pref. ...	95—98*	−3	...
200,000	,,	June 25	6½	6½	Do. 6½ p.c. Red. Deb.	99—102	...	...
1,076,490	,,	Aug. 10	6⅔	6⅔	Tottenham District Ord. ...	103—106	+1	104—105½
150,000	,,	,,	5⅓	5⅓	Do. 5⅓ p.c. Pref. ...	99—102	...	...
199,005	,,	June 11	4	4	Do. 4 p.c. Deb. ...	78—81	...	...
85,701	,,	Mar. 19	6	6	Tuscan, Ltd., 6 p.c. Red. Db.	74—79	...	...
310,694	,,	Aug. 24	7	7	Uxbridge, Maidenhead, & Wycombe 5 p.c.	100—105*	−2	102
88,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	88—93*	−2	...
1,322,220	,,	July 9	7	7	Wandsworth and District: Consolidated	111—114	...	112—113¾
426,000	,,	,,	5	5	Do. 5 p.c. Pref.	97—100	...	97
1,013,464	,,	June 25	5	5	Do. 5 p.c. Deb.	100—103	...	...

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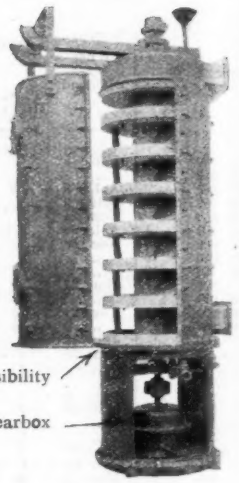

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Bournemouth Gas & Water Co.	*Repeat*
British Gas Light Coke Co.	*Repeat*
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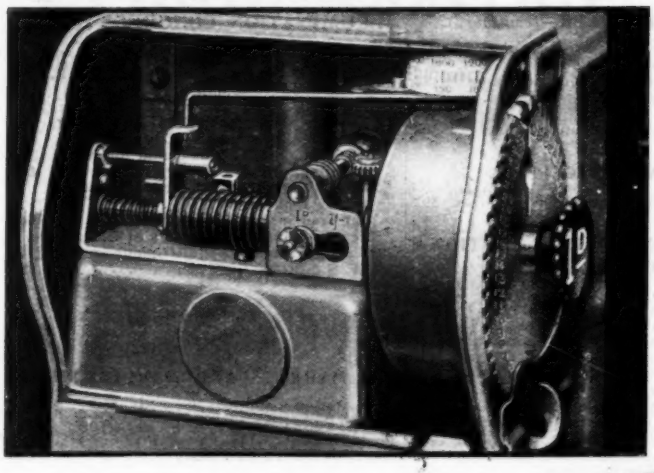

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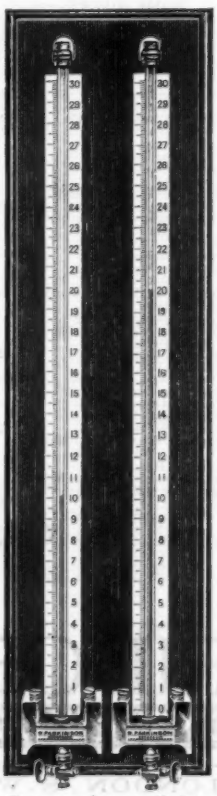

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